I. A STUDY OF THE NEOTROPICAL FINCHES OF THE GENUS SPINUS.

By W. E. Clyde Todd.

INTRODUCTION.

As all ornithologists who have had occasion to work with them are aware, the South American Goldfinches as a group have long been in need of further elucidation. Thus it was that in attempting to identify the series of these birds in the collection of the Carnegie Museum the writer became involved in a research which eventually led to a critical study of the entire group, the results of which it may be well to place on record for the benefit of other workers, together with some theoretical considerations suggested by the distributional problems presented. The present revision is put forth, however, more as a contribution towards a better understanding of the birds of this exceptionally difficult group, and as an aid in their identification, than as the final word on the subject. Since Sharpe's review of the genus Spinus in Volume XII of the Catalogue of the Birds in the British Museum appeared in 1888 no less than seven new forms (all but one valid) have been described from South America, while four more are added in the present paper. What makes the satisfactory definition of the several forms and the proper allocation of specimens so hard is the unusual range in individual, seasonal, and age variation which obtains, unduly complicating the study of geographic variation. Even with the aid of large series, it is not always possible to be sure where certain odd specimens should be placed. With more than one form occurring in a given place, the wonder is how the birds know themselves apart!

The writer has had the advantage of a magnificent series of skins, more than one thousand in all, for the purposes of this study. Of these one hundred and thirty-six are in the collection of the Carnegie Museum; the remainder were loaned by the following institutions: the American Museum of Natural History; the Museum of Comparative Zoölogy; the United States National Museum; the Field Museum of Natural History; the Bureau of Biological Survey;

the Academy of Natural Sciences of Philadelphia; the Museum of Princeton University; the Museo Nacional de Historia Natural of Buenos Aires, Argentina; the Senckenbergische Naturforschende Gesellschaft of Frankfort-on-Main, Germany; the Musée Polonais d'Histoire Naturelle of Warsaw, Poland; and the Zoologisches Museum of Berlin, Germany. To the authorities of these several institutions he takes this opportunity of again returning thanks for their uniform courtesy, and especially for the loan of several type-specimens, which have proven invaluable in settling certain doubtful points.¹ The material received from the American Museum of Natural History (through the courtesy of Dr. Frank M. Chapman) was especially helpful, including as it did good series from sundry localities in Ecuador, Peru, and Bolivia, which were otherwise unrepresented. Acknowledgments are due also to Dr. Charles W. Richmond, Dr. Alexander Wetmore, and Dr. Harry C. Oberholser for their kindness in looking up certain references in the literature, and to Dr. Roberto Dabbene, Dr. Frank M. Chapman, Mr. Samuel N. Rhoads, and Dr. C. E. Hellmayr for information concerning certain localities, and to the last named for making some needed comparisons of material in the British Museum. The references in the synonymy have all been verified, but their allocation is not beyond question in some cases, where the specimens on which they are based have not actually been examined. Mr. Ernest G. Holt is responsible for the measurements, which are in millimeters, and the length of the bill is that of the exposed culmen. Unless otherwise specified, averages are based on a series of ten specimens. The names of colors are mostly taken from Mr. Ridgway's Color Standards and Color Nomenclature.

CHARACTERS AND DISTRIBUTION.

The writer has long felt that the so-called "Family" Fringillidæ has been made to include at least two groups worthy of family rank, as families go in the *Passeres*. It was accordingly of interest to find

¹The types of the following published names have been examined in this connection: Carduelis stanleyi Audubon, Carduelis atratus D'Orbigny and Lafresnaye, Chrysomitris bryantii Cassin, Spinus olivaceus von Berlepsch and Stolzmann, Spinus ictericus peruanus von Berlepsch and Stolzmann, Spinus alleni Ridgway, Chrysomitris siemiradzkii von Berlepsch and Taczanowski, Chrysomitris capitalis Cabanis, Spinus ictericus magnirostris Dabbene, Spinus nigricauda Chapman, Spinus spinescens capitaneus Bangs, and Carduelis yarrellii Audubon.

13

Prof. Peter P. Sushkin, the eminent Russian ornithologist, after an extended survey of the field, expressing similar views. The outline of classification of the genera which this authority has published (Auk, XLII, 1925, 260) is certainly suggestive and merits careful attention. While it is a far cry from the slight and slender bill of Acanthis to the massive bill of Hesperiphona, they both fall in the same Subfamily, the Carduelinæ. Prof. Sushkin remarks upon the present geographical distribution of this group, which is clearly of Old World origin. The genera entering North America do not go much south of the Boreal Zone, at least in the breeding season; they are eminently northern in their distribution. But to this rule there is one conspicuous exception, the genus Spinus, which ranges right through to South America; where it is well represented, especially in the Andean region, and even reaches the southern tip of the continent. When we consider that it is the only Palæarctic genus of the Finches which has found its way into the southern continent, we can see how a study of its development there might be of peculiar interest.

Certain features of the color-pattern in Spinus, persisting through a considerable variation otherwise, appear to indicate the genetic relationship of its component members. Considering now the Neotropical forms alone, we find that in one small group of three species the throat is uniform with the rest of the under surface, only the cap being black. S. yarrellii, the best known species of this group, has a remarkable distribution, being found in the extreme eastern part of Brazil, and reappearing unchanged in northern Venezuela, with no records for the intervening region. An interval of two thousand miles and the valleys of the Amazon and Orinoco Rivers separate the present areas inhabited by this species, yet its range must once have been continuous, and much more extensive. The group is represented in the Temperate Zone of the Eastern Andes of Colombia by a distinct but closely allied species, S. spinescens, the darker coloration of which is precisely what we should expect of an Arid Tropical form upon entering a humid environment. In the Central and Western Andes of Colombia S. spinescens has itself become modified into a third species, S. nigricauda, characterized by the loss of the yellow area at the base of the tail, which is wholly black, and by the approximation in color of the sexes. In the juvenal stage all three species are much alike.

One of the interesting developments of the present study has been

Annals of the Carnegie Museum.

the discovery that the females of some species exhibit two phases of plumage, apparently not at all dependent upon season or age. In what I call "imperfect plumage" they are decidedly grayish below, this being true in the cases of S. yarrellii and S. spinescens, which we have been considering. We come now to a group of species in which the females are invariably of the latter type of coloration, while the males, although black-hooded, show a tendency to restriction of the black on the sides of the head. The group includes two species, S. capitalis and S. crassirostris. The former is known from the Temperate Zone in Ecuador, and reappears unmodified at several isolated points in Peru and northern Chile, its exact range in these latter countries remaining to be worked out. S. crassirostris is a remarkable form, peculiar to the higher elevations of the Andes in northern Argentina and Chile. Its bill is enormous for a Spinus, and would suffice to take it out of this genus were it not that it agrees otherwise. The characters of the adult females of these two species serve to set them off sharply from other known forms.

The smallest and brightest colored South American species of the genus is S. siemiradzkii, which is confined to the Arid Tropical Zone of western Ecuador and the adjacent part of Peru. No form of the group is known from western or northern Colombia, and to find the nearest relative of S. siemiradzkii we have to go all the way to the north coast of Venezuela, where, again in the Arid Tropical Zone, we meet with a species (S. cucullatus) which in size, proportions, and color-pattern is a close replica of the bird from Ecuador, but which has the yellow of the latter replaced by red. Such a replacement is understandable on the basis of Keeler's theory of the sequence of colors (Occasional Papers California Academy of Sciences, No. III, 1893, 154), but in any event these two species, although widely separated geographically, are beyond question closely related. Their probable trans-Andean representative is S. longirostris, known only from the highlands of British Guiana. In its coloration this form is much like S. magellanicus ictericus; in size and proportions it resembles S. cucullatus, but it has a larger and slenderer bill than either. This combination of characters, taken in connection with its isolated habitat, suggests its specific distinctness. The peculiar brownish tone of its plumage is repeated in S. olivaceus, a species of the Subtropical Zone, which ranges over the eastern or Amazonian slope of the Andes all the way from southeastern Ecuador to the Yungas of

Cochabamba in Bolivia. *S. olivaceus* agrees in general with the other members of this restricted group, but differs in that the light terminal edgings of the tertiaries, which are so prominent a feature in the other species, are scarcely apparent.

Coming now to the S. magellanicus group, we find that it has a wide distribution, ranging from eastern Brazil to the Andes of Bolivia, and south to Argentina. The typical race is confined almost entirely to the Province of Buenos Aires in the latter country, and to the adjacent parts of Uruguay. Farther north, in the Chaco of Argentina and in the campos region of Paraguay and Matto Grosso west to the foothills of the Andes, it gives way to a smaller and paler race, alleni. The eastern States of Brazil, north to southern Bahia, are occupied by a third race, *ictericus*, characterized by its rather deeper and richer general coloration. Beginning again with true magellanicus, but advancing in a different direction, this time northward along the Andes, we find another and unbroken series of three races. Between the region occupied by typical magellanicus and the area where we first meet with tucumanus, in western and northern Argentina, there is a wide stretch of country for which there are no records. If this gap in distribution is real and not merely apparent it is a significant circumstance. In tucumanus the bright colors of magellanicus are appreciably toned down, and in *bolivianus* this is carried a step further, while the upper parts tend to become streaked. Still farther north, in Peru, we find a form, urubambensis, in which the coloration is again brighter in the male and apparently duller in the female.

It appears that *Spinus magellanicus* has been able to adapt itself to a considerable range in latitude and altitude. While the typical race is found only in the low country, *ictericus* occurs from sea-level well up into the coastal mountains in the States of São Paulo and Rio de Janeiro. The Andean races, on the other hand, occupy successively higher ground, generally speaking, as we proceed from south to north, suggesting their development in this direction. In Peru the representative of the *magellanicus* group is found associated with an allied, but apparently specifically distinct form, *peruanus*, smaller and more brightly colored. The remarkable thing about *peruanus* is that it ranges absolutely unchanged from sea-level up to an elevation of 12,400 feet in the Andes, running thus through three life-zones. This extraordinary altitudinal range is hard to explain for one not on the ground. It may be due to the effect of the cold

ANNALS OF THE CARNEGIE MUSEUM.

16

Humboldt Current on the climatic conditions of these parts, or to causes inherent in the economy of the birds themselves. In northern Peru and Ecuador *peruanus* is represented by a smaller race, *paulus*, which similarly has an extensive altitudinal distribution, although not known to range so high up as the other. Still another species, *S. santæcrucis*, perfectly distinct from the *magellanicus* and *peruanus* types, has been discovered in and appears to be restricted to the foothills of the Andes in the Province of Santa Cruz, Bolivia, where it occurs associated with *S. magellanicus alleni*. It is close to *alleni* in size, but has acquired much black on the upper parts.

To find any more representatives of *Spinus* of the black-hooded type we shall have to go a long distance, to the highlands of Mexico, where we meet with an outlying species of the group, *S. notatus*, which ranges south as far as Nicaragua. In *S. notatus* the sexes are similar, the bill is long and slender, and the wings show little or no lighter edgings, characters indicating a considerable advance upon those of the black-hooded group as expressed in South America. The black of the head, too, is more extended below, and taken altogether the form seems to be well specialized, and clearly an offshoot from Neotropical stock. In western Mexico it has developed into a fairly well marked subspecies, *forreri*.

North of Ecuador no form of *Spinus* is known from the Tropical Zone, but in the Subtropical we find a very distinct species, *S. xanthogaster*, which has the upper parts as well as the throat and breast wholly black. Its northward range, like that of so many others of this zone, is interrupted by the Panama "fault," but it reappears beyond this break and is found virtually unchanged when the proper altitude is attained in western Panama and in Costa Rica. South of Ecuador there is another break (however, possibly only apparent and not real) in its range, until the Yungas of Bolivia are reached, where it reappears in a slightly modified form, *S. stejnegeri*.

There remain to be considered the species of *Spinus* from the more southern Andes, *S. barbatus*, *S. uropygialis*, and *S. atratus*, these three appearing to constitute a natural group. All are large, vigorous birds, fitted to withstand the cold of these parts. They have in comparison longer wing-tips, indicating a more migratory, rather than sedentary, habit. The male of *S. atratus* in its black upper parts resembles the same sex of *S. xanthogaster*, but the females of the two forms are very different, and they can have no close relationship.

Besides, S. atratus, according to Dr. Chapman, is a species of the Puna or Paramo Zone, at least in the breeding season, and advances northward into Peru only with the extension of that zone. S. uropygialis is little known, but appears to have a comparatively restricted range in the Chilean cordillera; it is a step on the way to atratus, the black areas being more interrupted and restricted. S. barbatus, which enjoys an extensive range in Chile from Atacama to Cape Horn, is the most generalized form of all, the black on the head being restricted to the crown and a spot on the throat, the latter spot sometimes obsolete. Its characters are nearer those of S. spinus of the Palæarctic Region than any other of the South American forms, so far as the adults are concerned. But the young, like all the rest of the Neotropical forms of Spinus, are very different indeed, being unstreaked, save for a trace on the crissum.

PHYLOGENY AND ORIGIN OF THE GROUP.

From the above outline of the facts it will be seen how very complicated is the problem of the relationships of the forms under consideration. I am perforce obliged to approach this problem without that background of first-hand familiarity with the country which some may deem essential for its proper understanding, but in spite of this handicap I venture to offer some tentative conclusions suggested by my closet studies. In the first place, the most striking thing we notice about the Middle and South American Goldfinches is their frequent discontinuous distribution. This of itself is supposed to indicate antiquity of origin and dispersal. The second thing we notice is that over a considerable area in the Andean region the several types do not represent each other geographically, but meet on common ground, retaining their respective characters. We infer from this that such groups of forms have no *immediate* relationships, but have differentiated before their ranges began to overlap. In the third place, we notice that while the Goldfinch group at large avoids the forests of the Amazon and Orinoco Valleys, it has otherwise an exceptionally wide range, both latitudinally and altitudinally, and behaves precisely as do other groups, the tropical origin of which is undoubted, responding to the influence of environment in a similar way. This indicates unusual plasticity and adaptability to varying conditions, and suggests why it is that Spinus, alone of all the Palæarctic Finches, has succeeded in reaching South America and thriving

there, while still retaining its generic identity. Before we can discuss the question of how the genus may have entered South America we shall have to consider its development there.

My studies lead me to believe that the forms with the least black in the male plumage, and particularly on the head, are the more primitive and more generalized types. S. yarrellii, with its black cap, would seem to be less advanced than the members of the blackhooded group. Now, we have seen that the range of yarrellii is not only much restricted, but also discontinuous. We are therefore justified in assuming a former extensive range for what seems to be now a disappearing species, surviving in two isolated regions. Such a range must have taken in an enormous stretch of territory off the northeastern coast of Brazil, Guiana, and Venezuela, at the time when the continent extended far beyond its present limits in this direction. It must have antedated, too, the formation of the Amazon and Orinoco Rivers. With the gradual recession of the shore-line, and the intervention of the valleys of these great rivers, with their unsuitable ecological conditions, the range of yarrellii must have been cut in two, until now we find it inhabiting distinct areas two thousand miles apart. In both of these areas, too, it looks very much as if it were being forced off the map, so to speak, by the advance of certain other species of this group, later immigrants, better fitted to survive in the struggle for existence. Opposed to this view is the fact that the Goldfinches, as we know them here in the north, are sociable, tolerant birds, not objecting to the company of other kinds of similar haunts and habits. But it is significant that no other species of Spinus is known to occur in the range of yarrellii.

Assuming such an extended range for *yarrellii*, it is not difficult to understand how it may have given rise to a Subtropical Zone form where its range impinged upon the Andes as they were being elevated. As the mountains continued to rise the birds kept pace with them, eventually entering the Temperate Zone, still retaining the black cap as evidence of their ancestry, but with their bright colors appreciably toned down, thus evolving into a different species, *spinescens*. It is true that *yarrellii* is not known to have a distinct representative in the Subtropical Zone; such a form is purely hypothetical. I might suggest that a form of this type may have once existed in the Subtropical, but was eliminated through competition with a later invader, possibly *S. xanthogaster*. Or it is conceivable that under certain

conditions yarrellii may have entered the Temperate Zone directly from the Tropical, at some point where the intervening zone had been omitted. The fact that the species, as we know it today, avoids the regions of humid subtropical forest would argue in favor of this view. These explanations are admittedly weak, but they are the only ones which come to mind at present; perhaps those familiar with the ground may have something better to offer. At any rate, whatever may have been the steps in the process, it seems clear that Spinus spinescens of the Temperate Zone of the Eastern Andes of Colombia is closely related to, and was probably derived from, S. yarrellii of northern Venezuela and eastern Brazil. (The form of the Sierra Nevada de Santa Marta, capitaneus, is merely a slightly modified race of spinescens). Moreover, since S. nigricauda of the Central and Western Andes of Colombia, with its wholly black tail and highly colored female, is a further step in advance, we have a right to infer that development began in the east and proceeded westward. The three species in question are links in a chain which reaches its farthest point in one direction in nigricauda.

Upon entering the Temperate Zone in Ecuador we meet with a bird of this group, *S. capitalis*, which is of peculiar interest. The male usually has the black of the crown extended over the sides of the head to the throat, but this color is much restricted posteriorly on these parts, and sometimes virtually wanting, when the bird looks not unlike *spinescens*. The female is invariably dull grayish below, exactly as in the large proportion of females of the latter form which are in what I call "imperfect plumage." These facts in my judgment imply that *capitalis* is a derivative of *spinescens*, evolved through isolation, but just what geographical factors are involved I am not prepared to say.

S. crassirostris, of the higher elevations in Chile and northwestern Argentina, I regard as a highly specialized descendant of the *capitalis* type, standing at the farthest end of the series from an evolutionary as well as a geographical standpoint, having been derived from the north.

Taking up now the black-hooded group of the genus, which impresses one as being somewhat more advanced than the black-capped group, I conceive that *S. longirostris* is nearest the primitive type. This form is at present known only from the highlands of Guiana, but its prototype was almost certainly a bird of much wider distribution.

It is a small species, with a particularly short tail and a short wing-tip, characters which are repeated and emphasized in S. cucullatus of the northern coast of Venezuela and S. siemiradzkii of western Ecuador. Since their respective ranges both lie on the farther side of the Andes, but are otherwise widely separated from each other, it may be that these two species are related only through derivation from an ancestral form (longirostris or its prototype?) which was able to cross the mountains at two isolated points and establish itself on the farther side, eventually becoming modified into two perfectly distinct species, both of restricted distribution. Or it is even possible that a strip of Arid Tropical may at one time have served to connect the respective range of the two species west of the Andean chain. At this point we naturally look for a Subtropical Zone representative of this group, and we find it, I am inclined to think, in S. olivaceus. This species is little known, but the fact that it appears to be confined to the Subtropical Zone of the eastern or Amazonian slope of the Andes signifies that it was derived from the east. Probably it originated in eastern Ecuador, and subsequently spread southward into Peru and Bolivia, following its appropriate zone. Why it did not happen to spread northward through Colombia at the same time I am not prepared to explain.

Goldfinches of the black-hooded group are found south of the Amazon Valley also, but are of a somewhat different type, having longer tails in proportion, and being in general rather larger. The three forms alleni, ictericus, and magellanicus intergrade with one another so completely that they must be regarded as conspecies; their respective ranges are contiguous. But between magellanicus and its nearest relative to the westward, tucumanus, there appears to be a gap of considerable extent, where no form of the genus is known to occur. Nevertheless, tucumanus is so close in its characters to magellanicus that it can scarcely be regarded as otherwise than conspecific. As we go northward along the Andes tucumanus passes into bolivianus, and this in turn into urubambensis of Peru, all intergrading forms. The exact relationships of Spinus santacrucis, on the other hand, are by no means clear as yet, but may be with S. magellanicus alleni, which may have undergone modification after reaching the eastern foothills of the Andes.

The indications are, therefore, that S. magellanicus as a species was developed in eastern Brazil as a form of the Tropical Zone, that it

spread thence to the southward into Argentina, and thence, after an interval, northward along the Andes as a form of the Temperate Zone. This will account for the dissimilarity in characters and range between *bolivianus* and *alleni*, both of which occur in Bolivia within a short distance of each other. It remains to consider the relationship between the *magellanicus* group of conspecies on the one hand and the forms of *peruanus* on the other. While they are amazingly alike, they meet in Peru as distinct species, their ranges actually overlapping in the higher elevations. The bright coloration of *peruanus* tends to support the idea that it is primarily a form of the Tropical Zone, but it must have been developed independently of the *magellanicus* group, and it is scarcely likely to have been derived from the northern short-tailed forms.

The characters and distribution of the three species barbatus, uropygialis, and atratus suggest that they stand in the same geographical relation to each other as the three Andean races of the magellanicus group; that is, they have proceeded from south to north, independently of any other forms of the genus. But unlike the forms of the magellanicus group, their differentiation is complete, and they have attained the dignity of species. The most southern member of the group, barbatus, is also the most primitive in its characters. In S. atratus, on the contrary, we have a bird in which the tendency to melanism reaches its fullest development, even the female being black. S. uropygialis stands midway between the other two.

The only other species with wholly black upper parts is a Subtropical Zone form, S. xanthogaster. It stands in a class by itself, with no near relatives in the genus. Its small size, very short wing-tip, and differently colored female show clearly that it has nothing whatever to do with S. atratus. In casting about for its possible antecedent, supposing such to be still extant, I soon became convinced that no known form of Spinus (as at present understood) could possibly be considered in this connection, and that it would be necessary to look elsewhere. After a careful survey of the field I have become convinced that in Astragalinus psaltria we have the object of our search, a species which satisfies all the biological and geographical conditions of the problem. In the northern part of its range A. psaltria has a black cap, greenish upper parts, and large white spots on the rectrices. As we go south we find all these characters gradually changing, the upper parts becoming mixed with black and finally entirely of this color. Towards the southern part of its range the white spots on the tail also tend to disappear. Now, Spinus xanthogaster has all the earmarks of having been derived from such a bird as an Astragalinus psaltria in the black-backed stage; it is in fact the transformation we should expect were the latter carried into the Subtropical Zone. The two birds are of the same size, and have the same characteristically short wing-tip; the upper parts are black in both; and both have the rump-feathers with indications of light-colored bases. The white at the base of the remiges and rectrices in *psaltria* is vellow in *xantho*gaster, and the latter has assumed a black breast, characters which are merely a further step in what appears to be the natural course of color development in the group. Females and young of the two forms are certainly very much alike. Moreover, the range of the black-backed form of *psaltria*, occupying as it does the Tropical Zone immediately below the Subtropical range of xanthogaster (to the exclusion of any other form of the group), is an additional argument for such a view of their relationship. In short, the evidence goes to show that Astragalinus psaltria had its origin in North America; that it has extended its range into northern South America, with increasing melanism as it passed southward into the Tropical Zone; that after it had attained black upper parts, but before it had lost the white spots on the rectrices, it gave rise to a Subtropical Zone offshoot, which is now Spinus xanthogaster; and that this latter form has followed the Subtropical Zone as far as Bolivia, where it has become slightly paler.

If I have correctly interpreted the facts in this case, I regard this conclusion as one of the most interesting and suggestive the present study has brought to light. Reserving the case of the Mexican species, *S. notatus*, for later treatment, I proceed at once to the question of the status and relationships of the supposed genus *Astragalinus*. It has been kept distinct from *Spinus* not because of any difference in structural characters, but only by reason of different features in its coloration. Mr. Ridgway (*Bulletin U. S. National Museum*, No. 50, I, 1901, 108) remarks that "the difference between the two groups in style of coloration seems all the more important when it is taken into consideration that in other respects as to coloration there is a very great range of variation in both groups." But if my conception of the relationship between *Spinus xanthogaster* and *Astragalinus psaltria* is correct, then this difference in the style of coloration must

be of much less importance than has been supposed, so far at least as these two species are concerned. I hope to show that by analogy the other species referred to Astragalinus are similarly involved. In the case of the American Goldfinch, Astragalinus tristis, a certain proportion of the adult male specimens examined show a white area at the base of the primaries, more or less concealed by the primary-coverts. This corresponds of course to the yellow area shown by the species of Spinus. The white on the tail is at the ends of the feathers, instead of at their bases, but when we recall that in at least one species of Spinus, S. nigricauda, the yellow at the bases of the tail-feathers has been lost, this character rather loses its value. In the Lawrence Goldfinch, A. lawrencei, the outer rectrices have a large white spot near their ends, and the primaries are yellow basally on the outer webs, producing almost the same effect as in Spinus. Again, to maintain Astragalinus on the basis proposed by Mr. Ridgway may necessitate the reference of several African species to the group, a fact doubtless overlooked by him, since these are uniformly without any yellow at the base of the remiges and rectrices. After going over the whole ground, both from the taxonomic and the zoögeographical point of view, I am convinced that we gain nothing by. recognizing a distinction without a difference, and I therefore formally propose to merge Astragalinus with Spinus.

As for Loximitris, the monotypic Cardueline genus of the island of Haiti, I am not so sure, although Prof. Sushkin tells me that he favors merging it with Spinus. Loximitris has a rather large, swollen bill, but is not more abnormal in this respect than Spinus crassirostris. While its wings are plain black, the rectrices are largely yellow, with black tips; the black hood is restricted. Moreover, the female is distinctly streaked, which is decidedly not true of any of the Neotropical forms of Spinus. It is significant that the latter, taken as a whole, do not show a streaked plumage, even in the juvenal stage, in which respect they differ widely from the type of the genus, S. spinus, and from its American representative, S. pinus. Not even in S. barbatus, which otherwise approximates spinus in its characters, is this feature present, as I have been at some pains to point out. (Several species besides barbatus show traces of such a color-pattern, it is true, in the shape of dark streaks on the crissum in some individuals). We conclude, therefore, that the Neotropical forms of the group could not have been derived directly from the boreal forms. Further-

more, consideration of the geographical distribution of the forms in question tends to bear out this conclusion. S. pinus is clearly a more primitive type than the Eurasian S. spinus, since the streaked style of plumage of the young of the former is retained in the adults of both sexes, while in the latter it gives way to a vellow and green dress in the adult male, although retained in the female. The logical inference in this case would be that the Eurasian form has been derived from the American form, instead of the reverse, as has generally been assumed. It is more likely, however, that the streaked type was once circumboreal, and has since developed further in Eurasia than in America, for reasons not now apparent. The geographical history of S. pinus in North America is easy to trace. In common with other boreal forms of life, it seems to have been driven far southward by the advance of the ice during the Pleistocene Period, and remained there long enough to undergo modification. Thus it happens that in the highlands of southern Mexico we find a race, macropterus, with slightly longer wings and tail and a tendency to fewer streaks beneath, and in the mountains of Guatemala a distinct species, S. atriceps, which has developed a black crown, but betrays its close affinity to pinus in the streaked young, which are scarcely or not distinguishable from the same stage of pinus. Guatemala, I take it, marks the farthest advance of the pinus group into the Neotropical Region, the limit of its attempted southern invasion. On the other hand one of the purely Neotropical species of the genus, S. notatus, a form with unstreaked young, has succeeded in pushing its way well to the northward of this limit, occupying most of Mexico. The two groups, advancing from opposite directions, here meet and overlap. This in itself is a strong argument for their different descent. But while the Neotropical species have thus developed independently, as it were, from the boreal forms, they are suspiciously similar to certain Eurasian members of the same generic group, S. spinoides and S. ambiguus, for example.

It is generally recognized that during at least a part of the Tertiary Period North America must have been connected with Asia by way of Behring Strait, and possibly also with Europe by way of Greenland and Iceland. The evidence for this is abundant and convincing, and need not be discussed here. It has been assumed that such a former connection is ample to account for certain resemblances between the respective faunas of South America and the Old World. It has been

supposed that the groups in question originated in Eurasia, crossed the land-bridge into Alaska, and then extended their range to the southward, eventually reaching South America. It is quite true that in the case of certain forms, Cinclus for example, the evidence certainly points to such a course (cf. Stejneger, Smithsonian Miscellaneous Collections, Quarterly Issue, XLVII, 1905, 421-432). But where this was the case we should expect to find some indications that these forms had come that way, in the shape of relict colonies scattered along the route, left behind as the main body advanced. Such relict forms actually occur, as we know, not only in the case of Cinclus, but also in numerous others. But it seems to me that such a hypothesis is entirely too weak when applied to the great bulk of the cases which can be cited, that it assumes far too much, and disregards too many facts of distribution. I do not see how it can be twisted to fit the facts in the case of Spinus, and I feel that we must look elsewhere for the needed explanation. In offering such I am fully aware that such noted authorities as Prof. Henry F. Osborn and Dr. W. D. Matthew discount the idea of any former land-bridge involving North and South America with any other continent, except the one at Behring Strait. While I am not competent to discuss the palæontological evidence on this point, I cannot help but feel that some of the explanations of avian distribution compelled by this position are forced and unnatural.

In lieu of this unsatisfactory conception I am inclined to favor the theory, advanced by Scharff and others, of a hypothetical Tertiary land-bridge across the Atlantic, from the West Indies to the Mediterranean countries of Europe. The idea of such a connection is not so fanciful as it appears at first glance. In a previous paper (*Annals Carnegie Museum*, XIV, 1922, 106) I have given reasons for believing that there has been a depression of 11,000 or 12,000 feet along the northern coast of the South American continent. If this subsidence extended to the eastward, as it probably did, the land also must have stretched far in that direction before the sinking took place. Indeed, the idea has even been advanced that the Atlas Mountains of North Africa are merely the continuation of the coast range of northern South America. It is true that Scharff does not admit a direct connection of this supposed land-bridge with northern South America, but I think in view of the foregoing considerations such a

connection is indicated. We should then have a satisfactory explanation for the entrance of the Palæarctic genus *Spinus* into South America without involving North America. For the characters of the South American forms clearly indicate that they were derived not from the boreal American form of the same genus, but from some form or forms which had already differentiated considerably from the primitive stock. The characteristic wing- and tail-pattern of *Spinus*, on the persistence of which so much stress has been laid, I find repeated with variations not only in the Eurasian forms of that group, but also in other Old World genera, such as *Carduelis* and *Chloris*.

The objections to this theory may be briefly stated. They are, first, that if such a land-bridge ever existed, it ceased to exist in the early Eocene, and consequently before the time when it is believed birds of the Passerine type came into being. To this I would reply, first, that the evidence indicates that a Spinus of the black-capped type had already entered South America, presumably by such a land-bridge, while the basins of the Amazon and Orinoco Rivers were vet closed on the east. Either the evolution of Passerine birds was further advanced than has been supposed, or the formation of these rivers was later. In the second place, the birds could have used such a land-bridge long after it had been partially submerged, and left in the form of a chain of islands. One species of the group, S. barbatus, has been found as an accidental visitor on the Falkland Islands, two hundred and fifty miles off the mainland of Patagonia, showing that it can traverse a considerable expanse of sea. The second objection is that inevitably other Eurasian birds besides Spinus must have found their way across such a land-bridge, and there is no evidence for such an emigration. We are of course not justified in building up a hypothetical land-bridge merely to satisfy the requirements of one particular case. But I insist that this case is not unique, and that there is plenty of other evidence in favor of the theory, which evidence I hope to bring out in another connection. The third objection is a corollary of the second, and is that such a land-bridge would have served to carry some of the Neotropical fauna into Eurasia, for which there is no evidence. This objection I propose to discuss in the same connection as the last.

Assuming such a land-bridge as I have indicated, we can conceive how the prototypes of the New World forms of the group may have

crossed on it. Those that turned to the north and entered North America developed along lines that eventually resulted in producing forms with white on the tail, which we have been calling Astragalinus. One has only to compare A. tristis in the young or winter dress with Carduelis carduelis of the Old World to be convinced of their affinity. The branch that entered South America developed bright colors, as so many other birds have in the tropics, and retained the yellowcolored areas at the base of the wings and tail. One form of this group, pushing past the West Indies, seems to have entered Mexico independently, to become what is now Spinus notatus, while Loximitris dominicensis is the only known survivor in these islands. It is quite likely, in view of what we know, that the Goldfinches had already become differentiated into distinct species, before they reached their present homes, or at least on the way across during the numerous changes of level that affected the West Indies. We may suppose that the blackcapped group was the first to arrive, spreading over northern and eastern South America, and eventually working southward along the Andes, after undergoing considerable modification. It was probably followed by the black-hooded type, which crowded out the other in places, and eventually spread over a much larger area, splitting up into several forms under changing environment. North of the Amazonian sea it developed into smaller forms, with relatively shorter tails, but once across that barrier it increased in size and developed a longer tail as it entered the Temperate Zone and turned north along the Andes, meeting here the representatives of the other groups. A third invasion resulted in bringing in a still different type of Goldfinch, with a long wing-tip and stouter build, directly to the southern part of the continent, from which it has spread northward in high altitudes. This invasion probably took place at the same time as the entrance of so many other forms of northern affinities into temperate South America, the cause of which is not yet understood. And lastly, there is the case of the single species which was developed north of Panama and reached South America on a Subtropical Zone bridge, long since disappeared. The fifth invasion, or attempted invasion, carried the group no farther than Guatemala.

Such, in brief, is my explanation, or perhaps I should say attempt at explanation, of the facts brought out by my study of *Spinus* and related groups. In their distribution and characters, as we find them today, we may read a chapter of the geological history of the South

American continent. Undoubtedly, the complexity of the factors entering into this question is such that every scrap of available evidence becomes of value, and if in following out the ramifications of the problem far beyond the limits originally set I have been able to make some slight contribution towards its solution, and to provoke further discussion, the present thesis will well have served its purpose, for science seeks not to bolster up preconceived ideas, but to ascertain the truth.

SPECIES AND SUBSPECIES.

The following key to the forms treated in the systematic portion of this paper has been prepared with a view to placing them in their proper position, as nearly as can be done in a linear sequence. It is based on general average characters, as shown by a series of specimens, and cannot be made to answer for every example. The forms ordinarily placed in Astragalinus are not included. In this connection attention should be called to the indicated existence of at least two new and undescribed species of Spinus in South America. One of these is represented by a female example in the collection of the Carnegie Museum (No. 90,099), from the Paramo Frias, Andes of Venezuela, collected July 17, 1922. It is a most peculiar bird, very dark in general coloration, with little yellow on the tail, and with a large and heavy bill. It is markedly distinct from S. spinescens, specimens of which were collected at this same locality, showing that two species occur there. The second form is represented by four females, three from Las Ventanas, Santander, Colombia, September 19, 1916 (Nos. 57,620-2, Collection Carnegie Museum), and one from La Herrera (2,650 meters), Cundinamarca, Colombia (No. 126,690, Collection American Museum of Natural History). These appear to represent a form allied to S. peruanus paulus, but they differ in being darker, with the under parts gravish on the throat and breast, and a yellowish wash on the upper abdomen. In paulus it is the throat that has a yellowish wash. The discovery of the males of these two forms will be awaited with interest, pending which discovery it will be best to forego naming them.

KEY TO THE NEOTROPICAL FORMS OF SPINUS.

(Based on adult males, except where otherwise noted.) A. Throat without black, uniform with breast.

- a. Below bright yellow......Spinus yarrellii.
- a'. Below yellowish green.

b. Tail yellow basally.
c. BrighterSpinus spinescens spinescens.
c'. Paler and dullerSpinus spinescens capitaneus.
b'. Tail wholly blackSpinus nigricauda.
A'. Throat (more or less) black.
a. Sides of head at least partly black.
b. Sides of neck and of breast red or yellow.
c. Female (in perfect plumage) grayish below.
d. Smaller; wing of male averaging 68.5 mm
d'. Larger; wing of male averaging 79.5 mmSpinus crassirostris.
c. Female (in perfect plumage) more or less yellowish or greenish below.
d. Lesser wing-coverts black, with paler tips.
e. Smaller; wing of male averaging under 62 mm.
1. General color redSpinus cucuudus. f' Concred color vetlow
a Brighter: had aniling vellow.
g' Duller: back warbler-green Spinus longingstris
e' Larger: wing of male averaging over 62 mm
f. Rump scarcely or not different from the back.
g. Back lightly mottled with dusky brownish: light edgings of
tertiaries narrow and inconspicuousSpinus olivaceus.
g'. Back heavily mottled with black; light edgings of tertiaries
broad and conspicuous
f'. Rump yellow, in decided contrast with the back.
g. Smaller; wing of male averaging under 70 mm.; tail under
45 mm.
h. Edgings of tertiaries more whitish.
i. Larger; wing of male averaging 69 mm.
Spinus peruanus,
i'. Smaller; wing of male averaging 64.5 mm.
Spinus peruanus paulus.
n. Edgings of tertiaries more yellowish.
1. Below paler, purer yellowSpinus magellanicus alleni.
1. Below deeper, darker yenow
g' Larger: wing of male averaging over 70 mm : tail over 45 mm
h. Above with little or no dark mottling
i. General coloration brighter
Spinus magellanicus magellanicus.
i'. General coloration duller. Spinus magellanicus tucumanus.
h'. Above with more or less dark mottling.
i. Above darker, more olive-green, with more dark mottling;
female more yellowish below.
Spinus magellanicus bolivianus.
i'. Above brighter, more yellowish green, with less dark
mottling; female more greenish below
Spinns magellanicus urubambensis

Annals of the Carnegie Museum.

- d'. Lesser wing-coverts wholly black.
 - e. Below richer, deeper yellow......Spinus notatus notatus.
- e'. Below duller, less golden yellow......Spinus notatus forreri.
- b'. Sides of neck and of breast black.
 - c. Back and rump black.
 - d. Black below more restricted, leaving the lower breast yellow.
 - e. Yellow below deeper (lemon-chrome)
 - Spinus xanthogaster xanthogaster. e'. Vellow below lighter (lemon-yellow)

Spinus yarrellii (Audubon).

Fringilla mexicana (not Carduelis mexicanus Swainson) AUDUBON, Birds Am., V, 1839, 282, pl. 433, fig. of male ("Upper California"; descr. male).

Carduelis yarrellii AUDUBON, Syn. Birds N. Am., 1839, 117 ("Upper California" [error]; orig. descr.; type now in U. S. Nat. Mus.).—AUDUBON, Birds Am., 8vo ed., III, 1841, 136, pl. 184, part ("California"; fide Swainson; descr. male).

Fringilla yarrellii GRAY, Gen. Birds, II, 1849, 371 (in list of species; ref. orig. descr.).
Chrysomitris yarrelli BONAPARTE, Consp. Avium, I, 1850, 517 (diag.; ref. orig. descr.).—Sclater, Proc. Zool. Soc. London, 1857, 7 (Orinoco [River, Venezuela]; crit.).—BAIRD, Rept. Pacific R. R. Surveys, IX, 1858, 418 (diag.), 421 (descr.; references; crit.).—GIEBEL, Thes. Orn., I, 1872, 675 (references).—Sclater and Salvin, Nom. Avium Neotrop., 1873, 34 (Brazil, in range).—COOPER, Bull. Nuttall Orn. Club, II, 1877, 92 (crit.).—Allen, Bull. Nuttall Orn. Club, V, 1880, 88 (crit.; range).—FORBES, Ibis, 1881, 338 (Parahyba, Garanhuns, and Quipapá, Brazil).—SHARPE, Cat. Birds Brit. Mus., XII, 1888, 198 (Bahia and Pernambuco, Brazil; descr.; references).—BUTLER, Foreign Finches in Captivity, 1894, 44, in text (Bahia and Pernambuco, Brazil).—DUBOIS, Syn. Avium, I, 1901, 591 (ref. descr.; range).—NICOLL, Ibis, 1906, 669 (Bahia, Brazil).—SNETHLAGE, Journ. f. Orn., LV, 1907, 297 (in captivity).

- Astragalinus yarrelli CABANIS, Mus. Heineanum, I, 1851, 159, note (in list of species).
- Chrysomitris yarrellii CASSIN, Proc. Acad. Nat. Sci. Philadelphia, 1865, 93 ("Orenoque," Venezuela; crit.).—BAIRD, BREWER, and RIDGWAY, Hist. N. Am. Birds, I, 1874, 471, in text (crit.).—RIDGWAY, Proc. U. S. Nat. Mus., III, 1880, 213, and Bull. U. S. Nat. Mus., No. 21, 1881, 59 (crit. on range).
- Chrysomitris hypoxantha CABANIS, Journ. f. Orn., XIV, 1866, 160 (Bahia [typelocality] and Leopoldina, Brazil; orig. descr.; type in coll. Berlin Mus.).—VON PELZELN, Orn. Brasiliens, iii, 1870, 231, note, 440 (Cabanis' reference).— GIEBEL, Thes. Orn., I, 1872, 674 (ret. orig. descr.).
- Fringilla hypoxantha GRAY, Hand-List Birds, II, 1870, 82 (in list of species; range).

Fringilla yarrelli GRAY, Hand-List Birds, II, 1870, 82 (in list of species; AUDUBON'S reference).

Spinus yarelli [sic] VON IHERING, Aves Brazil, 1907, 380 (Bahia, Brazil).

Description. Adult male: above bright golden yellow (between sulphine-yellow and aniline-yellow) to warbler-green, often slightly mottled with darker centers on the feathers, brightening on the rump and upper tail-coverts into empire-yellow; tail black, with concealed base yellow; lesser and median wing-coverts externally like the back, black at the base; greater series black, tipped with lemon-chrome; wings black, with a broad basal band of lemon-chrome, wanting on the outer web of the outermost primary; inner secondaries margined externally with yellow toward their tips, tending to white on the longer feathers; primary-coverts black; pileum glossy black; sides of head and entire under surface bright lemon-chrome; tibiæ ecru-olive; under wing-coverts and inner webs of the remiges below mostly pale yellow. (Colors of soft parts unknown.)

Female: above, including the pileum, warbler-green, mottled with brownish centers on the feathers, brightening into sulphine-yellow on the rump; pattern of wings and tail as in the male, the yellow duller and more restricted; sides of head and under parts in general dull yellow (near wax-yellow), a little paler and purer posteriorly.

A female in juvenal dress (No. 53,366, Collection Field Museum of Natural History) is similar to the adult female, but the general coloration is paler and duller: above yellowish citrine, a little brighter on the head and rump; below citron-yellow, nearly uniform; wingcoverts tipped with the same color; outer margins of the inner secondaries broadly pale yellowish green toward their tips; yellow pattern on the wings poorly defined.

Measurements. Male: wing, 59-66 (average, 63); tail, 35-41 (38.5); bill, 10-10.5 (10.3); tarsus, 12-13 (12.5). Female: wing, 59-62 (60.5); tail, 35-38 (36.5); bill, 9.5-10.5 (10); tarsus, 13-13.5 (13).

Range. Eastern Brazil, from Bahia north to Ceará; reappearing in northern Venezuela.

Remarks. Audubon supposed that the species he described under this name came from California, and this error was perpetuated by other authors who quoted him. Specimens in the Academy of Natural Sciences of Philadelphia, said to have come from the Orinoco, led Sclater to suspect that the species was really a native of South America instead of North America. In 1866 Cabanis handled authentic specimens from Bahia and Leopoldina in Brazil, which he described under the name *hypoxantha*, which was formally placed under the synonymy of *yarrellii* by Sharpe in 1888. On the strength of this

record I would therefore propose to substitute Bahia, Brazil, as the type-locality of *yarrellii*. The chances are that "Bahia" skins come from the arid region lying back of the coast, and that the species properly belongs to the Arid Tropical Zone. At any rate, it avoids the Amazon Valley, to reappear in northern Venezuela, in the neighborhood of the Lake of Valencia, whence the Carnegie Museum has a full suite of specimens. I have compared this fine series carefully with Brazilian skins, and can find no substantial or constant differences, despite the gap existing in the range. Such a discontinuous distribution is comparable to that shown by certain other birds, although I do not now recall an exactly parallel case. The extent of its range in Venezuela remains to be determined.

Some of the Venezuelan series have the tail-coverts decidedly darker and greener than the rump, but others fit Sharpe's diagnosis in this respect. Two females in imperfect plumage are dull white below, with a faint tinge of yellow, and above are like the usual type of female, but darker and grayer.

Specimens examined. Brazil: Bahia, 15; Pernambuco, 2; Juá, near Iguatú, Ceará, 1; unspecified, 4. Venezuela: El Trompillo, Carabobo, 28. Total, 50.

Spinus spinescens spinescens (Bonaparte).

Chrysomitris spinescens BONAPARTE, Consp. Avium, I, 1850, 517 ("Bogotá," Colombia; crig. descr.; type in coll. Berlin Mus.).—CABANIŠ, Mus. Heineanum, I, 1851, 160 (Colombia; ref. orig. descr.).—LICHTENSTEIN, Nom. Avium Mus. Zool. Berolinensis, 1854, 46 (Colombia).—SCLATER, Proc. Zool. Soc. London, 1855, 159 ("Bogotá," Colombia; references).—CASSIN, Proc. Acad. Nat. Sci. Philadelphia, 1865, 90 (South America; crit.).—CABANIS, Journ. f. Orn., XIV, 1866, 160, in text (crit.).—GIEBEL, Thes. Orn., I, 1872, 675 (references).—SCLATER and SALVIN, Nom. Avium Neotrop., 1873, 34 (Colombia, in range).—HEINE and REICHENOW, Nom. Mus. Heineani Orn., 1882, 93 ("Bogotá," Colombia).— SHARPE, Cat. Birds Brit. Mus., XII, 1888, 199, part ("Bogotá," Colombia; descr.; references).—DUBOIS, Syn. Avium, I, 1901, 591 (ref. descr.; range).

Fringilla spinescens GRAY, Hand-List Birds, II, 1870, 81 (in list of species; range).
Spinus spinescens SHARPE, Hand-List Birds, V, 1909, 229 (in list of species; range).
—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 372 (ref. orig. descr.; range).
Spinus spinescens spinescens CHAPMAN, Bull. Am. Mus. Nat. Hist., XXXI, 1912, 161, in text ("Bogotá," Colombia; meas.; crit.); XXXVI, 1917, 563 (Bogotá, La Holanda, La Porquera, La Mar, Chipaque, and El Roble, Colombia).

Description. Adult male: above warbler-green, with faint brownish centers to the feathers, brightening on the rump into pyrite-yellow

or lemon-yellow; lesser and median wing-coverts externally like the back, with black bases; greater coverts black with lemon-yellow tips; remiges black, their bases externally (except outermost primary) lemon-yellow, forming a large patch on the closed wing; primarycoverts black; inner secondaries with broad external margins of pyrite-yellow toward their tips, inclining to gray on the longer ones; tail black, with the basal half or more pale yellow; pileum black; sides of head and neck warbler-green, like the back, brightening on the under parts into lemon-chrome, shaded anteriorly and laterally with pyrite-yellow, the lower abdomen grayish or whitish medially; tibiæ the same; under wing-coverts and inner webs of remiges below pale yellow; "iris brown; feet blackish; bill blackish, horn-blue below."

Immature male: above darker than the adult male (nearer olivegreen than warbler-green), with the brownish feather-centers more prominent; yellow areas of the wings paler and more restricted; under parts pyrite-yellow to strontian yellow, with grayish feather-tipping, the abdomen largely grayish white; crissum pale lemon-yellow, or whitish with a tinge of yellow.

Adult female: similar to the immature male, but pileum like the back, and under parts averaging duller. The female in imperfect plumage has the upper parts in general, and the pileum in particular, shaded with gray, and the lower parts almost uniform pale smokegray, irregularly mottled and shaded with olivaceous and yellowish. An unbroken series connecting the two extremes is represented in the material before me.

Juvenal plumage: above dull dark citrine, with obscure darker centers to the feathers; below pale yellow (primrose-yellow), shaded with olive lake, and with indications of faint brownish streaks.

Measurements. Adult male: wing, 67-70 (average, 68.5); tail, 42-46 (44); bill, 10-11 (10.5); tarsus, 14-15 (14.3). Female: wing, 64-68 (66); tail, 40-44 (42); bill, 9.5-10 (9.9); tarsus, 13-15 (14.5).

Range. Temperate Zone of the Eastern Andes of Colombia and of the Andes of Meridá, Venezuela.

Remarks. The description of the adult male is based on birds in fresh plumage (May-July). In worn breeding dress (October and March) the color of the upper parts is darker and duller; the terminal margins of the inner secondaries disappear; and the wings are more brownish. Aside from these seasonal changes, the males are fairly uniform *inter se*, so far as color is concerned. Females, however, vary through wide limits, from gray birds up to greenish ones almost as brightly colored as the males. This is probably due to age.

The measurements above quoted are of specimens from the Bogotá region of Colombia (the type-locality) and the Andes of Venezuela.

Birds from these two regions closely resemble each other, but oddly enough a series from the intermediate region, the northern part of the Eastern Andes, differ in their longer, slenderer bills, this member ranging in adult males from 10.5 to 13 mm. in length. Since this is the only difference, and it is not great, and is wholly bridged over by individual variation, I prefer not to recognize it by name, inasmuch as by doing so the range of *spinescens* would thereby be made discontinuous.

The close resemblance between the present bird and S. yarrellii suggests their relationship. Indeed, the "toning down" in the coloration of spinescens is just what we might expect to happen to a bird like yarrellii were it transferred to a higher zone. But S. spinescens is properly a species of the Temperate Zone, and while it is known upon occasion to range into the upper part of the Subtropical, it has no special representative in the Subtropics. Since S. yarrellii belongs to the Arid Tropical Zone, the two species are separated faunally by the width of the Subtropical Zone (at least), although doubtless approximating each other geographically. So if we accept such a hypothesis there remains considerable to explain.

Little is known of this species. It was described by Bonaparte from a "Bogotá" skin in the Berlin Museum, which had already received a manuscript name from Lichtenstein. It continued to be known only from such specimens until Dr. Chapman collected his series from this region. He says that it is "an abundant bird in the Temperate Zone of the Eastern Andes, occurring in great flocks on the Bogotá Savanna and descending less commonly to the upper portion of the Subtropical Zone." Mr. M. A. Carriker has met with it farther north in the same range, and more recently in the Andes of Meridá, Venezuela.

Specimens examined. Colombia: Ramirez, 4; Paramo Guerrero, 10; Paramo San Pedro, 6; La Pica, 1; Peña Blanca, 2; Lagunillas, 7; "Bogotá," 21; El Roble, above Fusugasuga, 8000 ft., 1; Chipaque, 1; Bogotá Savanna, 8750 ft., 5; La Porquera, above La Pradena, 2800 m., Cundinamarca, 1; La Holanda, 2650 m., 42 kilometers S. E. of Bogotá, Cundinamarca, 1; Cundinamarca, 1; La Mar, near Subachoque, 2680 m., Cundinamarca, 1; Anolaima, 1; Aguadita, 1; unspecified, 3. Venezuela: Guamito, 5; Teta de Niquitao, 10; La Cuchilla, 1; Paramo Frias, 4. Total, 86.

Spinus spinescens capitaneus Bangs.

Chrysomitris spinescens (not of Bonaparte) SHARPE, Cat. Birds Brit. Mus., XII, 1888, 199, part (San Sebastian and Sierra Nevada de Santa Marta, Colombia).

- Spinus spinescens capitaneus BANGS, Proc. Biol. Soc. Washington, XII, 1898, 178 (San Miguel, Colombia; orig. descr.; type now in coll. Mus. Comp. Zool.; meas.; crit.).—BANGS, Proc. New England Zool. Club, I, 1899, 79 (San Sebastian, Colombia).—ALLEN, Bull. Am. Mus. Nat. Hist., XIII, 1900, 121, 165 (Sharpe's and Bangs' references).—CHAPMAN, Bull. Am. Mus. Nat. Hist., XXXI, 1912, 160, in text (San Miguel, Colombia; meas.; crit.).—TODD and CARRIKER, Ann. Carnegie Mus., XIV, 1922, 534 (Macotama and Sierra Nevada de Santa Marta, Colombia; Santa Marta localities and references; crit.).
- *Chrysomitris spinescens* var. *capitanea* DUBOIS, Syn. Avium, I, 1901, 591 ("Santa Marta," Colombia, in range).

Spinus capitaneus SHARPE, Hand-List Birds, V, 1909, 229 (ref. orig. descr.; range). —BRABOURNE and CHUBB, Birds S. Am., I, 1912, 372 (ref. orig. descr.; range). Subspecific characters. Similar to Spinus spinescens spinescens, but averaging paler and duller, sex for sex.

Measurements. Male (seven specimens): wing, 66–69 (average, 67.5); tail, 43–46 (44.5); bill, 10–11 (10.5); tarsus, 13.5–14.5 (14). Female (seven specimens): wing, 65–70 (67); tail, 42–47 (44.5); bill, 10–10.5 (10.3); tarsus, 14–15 (14.5).

Range. Temperate Zone, Sierra Nevada de Santa Marta, Colombia. Remarks. This is not a very satisfactory form. It was discriminated by Mr. Bangs solely on the basis of its supposed larger size, but this character breaks down completely when tested by a series. Dr. Chapman thought it could be maintained on the ground of the more dusky or olivaceous cast of the lower parts in the male, and, so far as I can see, this is the only character of any value. All the females in the type-series are decidedly grayish below, which would be a good subspecific character were it constant. But a female in the von Berlepsch Collection, taken by Simons, is fully as greenish below as some specimens of true spinescens, indicating that the others are in imperfect plumage. The series of males, however, are obviously duller, more greenish, less yellowish below than males of spinescens in comparable plumage. The type of capitaneus is in fine fresh plumage; below it is precisely of the same shade of color as worn specimens of spinescens from the Paramo Guerrero (Eastern Andes) shot in October, but other males in the type-series are duller. The name capitaneus may be allowed to stand, although the race is by no means a well marked one.

Specimens examined. Colombia: Macotama, 1; San Miguel, 5; San Sebastian, 8; Sierra Nevada de Santa Marta, 9200 ft., 2. Total, 16.

Spinus nigricauda² Chapman.

Spinus nigricauda CHAPMAN, Bull. Am. Mus. Nat. Hist., XXXI, 1912, 160 (Paramo of Santa Isabel, 12,700 ft., Central Andes, Colombia; orig. descr.; type in collection Am. Mus. Nat. Hist.); XXXVI, 1917, 564 (Paramillo and [Paramo of] Santa Isabel, Colombia; diag.; ref. orig. descr.).

Description. Adult male: above Roman green, mottled with dark centers to the feathers, the rump paler (warbler-green), immaculate; pileum black; wings dusky black, the upper coverts tipped with green, like the back; the inner secondaries with narrow external margins of grayish, and all the remiges (except the two outer primaries) with lemon-yellow bases, forming a conspicuous patch on the closed wing; primaries narrowly margined externally with pale dull yellow; tail black, with narrow outer margins of warbler-green; under parts olive-yellow, paler (citron-yellow) on the abdomen medially and under tail-coverts, the latter with faint dusky stripes; "iris brown; feet blackish horn; bill black, bluish flesh-color below" (Carriker).

Female: similar, the pileum more brownish. Juvenal plumage (No. 70,734, Collection Carnegie Museum; Frailejonal, Colombia, Sept. 24): similar to the adult, but much duller, the pileum like the back, the greater and median wing-coverts with broad buffy tips, the secondaries conspicuously margined and tipped externally with pale dull yellow (near primrose-yellow); under parts (near) deep colonial buff, paler posteriorly, faintly flammulated with darker color; yellow wing-patch smaller.

Measurements. Male (six specimens): wing, 70–73 (average, 72); tail, 44–47 (46); bill, 10–11.5 (11); tarsus, 14–15 (14.5). Female (three specimens): wing, 69–70 (69); tail, 42–44 (43); bill, 11–11.5 (11.3); tarsus, 14.5–15 (15).

Range. Temperate Zone of the Central and Western Andes of Colombia.

Remarks. The affinities of this recently described species are clearly with *S. spinescens*, of which it appears to be a derivative. In juvenal dress the two species closely resemble each other, pointing to a common origin, but *nigricauda* has advanced further on its evolutionary road than *spinescens*, as shown by the fact that its female approximates the male in color when it reaches the adult stage. The loss of the yellow at the base of the tail is a good character in *nigricauda*, although I find a trace of this color in one specimen (the type). The species is known at present only from certain isolated localities in the Central and Western Andes of Colombia.

Specimens examined. Colombia: Frailejonal, ³ Central Andes, 5;

²Written thus because proposed as a substantive, and not as an adjective. ³This locality is practically equivalent to the next.

Paramo of Santa Isabel, Central Andes, 3; Paramillo, Western Andes, 3. Total, 11.

Spinus capitalis (Cabanis).

- Chrysomitris icterica (not Fringilla icterica Lichtenstein) SCLATER, Proc. Zool. Soc. London, 1858, 552 (Riobamba, Ecuador; descr.).—SCLATER, Cat. Am. Birds, 1861, 125, part (Riobamba, Ecuador).
- Chrysomitris capitalis CABANIS, Journ. f. Orn., XIV, 1866, 160 (Ecuador; orig. descr.; type in coll. Berlin Museum).—GIEBEL, Thes. Orn., I, 1872, 673 (ref. orig. descr.).—von BERLEPSCH and TACZANOWSKI, Proc. Zool. Soc. London, 1885, 85 (Mapoto, Ecuador; crit.).—SHARPE, Cat. Birds Brit. Mus., XII, 1888, 219, part (localities in Ecuador, part, not descr.).—SALVADORI and FESTA, Boll. Mus. Zool. ed Anat. comp. Torino, XV, No. 357, 1899, 27, part (Nanegal, Tumbaco, Puna, and Govinda, Ecuador; crit.).
- Chrysomitris barbata (not Fringilla barbata Molina) SCLATER and SALVIN, Nom. Avium Neotrop., 1873, 34, part (range).
- Chrysomitris sclateri SHARPE, Cat. Birds Brit. Mus., XII, 1888, 200, part (Riobamba, Ecuador; orig. descr. [male]; type in coll. Brit. Mus.).—DUBOIS, Syn. Avium, I, 1901, 591 (ref. orig. descr.; range).
- Spinus sclateri VON BERLEPSCH and STOLZMANN, Proc. Zool. Soc. London, 1896, 353, part (Mapoto, Ecuador; crit.).—VON BERLEPSCH and STOLZMANN, Ornis, XIII, 1905, 68 (Pauza and Coracora, Peru).—SHARPE, Hand-List Birds, V, 1909, 229 (in list of species; range).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 372 (ref. orig. descr.; range).
- Chrysomitris icterica capitalis HARTERT, Nov. Zool., V, 1898, 484 (Ibarra, Ecuador). —GOODFELLOW, Ibis, 1901, 475 (Quito and Chillo Valley, Ecuador).
- (?) Chrysomitris sp. SALVADORI and FESTA, Boll. Mus. Zool. ed Anat. comp. Torino, XV, No. 357, 1899, 28 (La Concepcion, Valle del Chota, Ecuador; crit.).
- Chrysomitris icterica var. capitalis DUBOIS, Syn. Avium, I, 1901, 592 (references; range).
- Chrysomitris magellanica capitalis LYNCH-ARRIBALZAGA, An. Mus. Nac. Buenos Aires, (3), I, 1902, 166 (range).
- Spinus capitalis SHARPE, Hand-List Birds, V, 1909, 231 (in list of species; range).—
 BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).
 —LÖNNBERG and RENDAHL, Ark. f. Zool., XIV, No. 25, 1922, 79 (Quito, Tumbaco, Chaupicruz, and Cumbaya, Ecuador).
- Spinus ictericus capitalis MÉNÉGAUX, Mission Service Geog. Mes. Arc Meridien Equat. Amér. du Sud, IX, i, 1911, B78 (Tumbaco and Santa Rosa, Ecuador; Ecuador localities and references, part).—MÉNÉGAUX, Rev. Franc. d'Orn., II, 1912, 390 (Baños sur le haut Pastaza, Ecuador).

Description. Adult male: above warbler-green, more or less mottled with darker centers to the feathers, the rump more uniform, but little if any brighter; tail black, with concealed yellow base, the middle rectrices nearly or quite all black; wings black, the remiges with a broad basal band of lemon-yellow, the inner secondaries broadly margined externally with grayish toward their tips, and the wing-coverts tipped with warbler-green, like the back; crown black; sides of head black, usually leaving the hinder part of the ear-coverts colored like the under surface; upper part of throat black; sides of neck, and under parts in general, plain dull yellow with a strong greenish shade (between lemon-yellow and pyrite-yellow), paler posteriorly, the tibiæ and lower abdomen medially usually grayish; under wing-coverts mixed grayish and yellowish; bill and feet dark (in skin).

Adult female: different from the male: above (including the crown) grayish with a greenish shade, more conspicuous on the rump, mottled with slight darker centers to the feathers; wings and tail brownish black, marked as in the male; sides of head and under parts dull grayish white, sometimes more or less washed with greenish.

Juvenal male (and female?): above brownish with a strong buffy shade, flammulated with darker color; below amber-yellow, flammulated with buffy; wings blackish, with broad and conspicuous outer terminal margins on the inner secondaries of deep olive-buff; otherwise as in the adult.

Measurements. Male: wing, 65–71 (68.5); tail, 42–47 (45); bill, 10–11 (10.5); tarsus, 14–16 (15). Female (six specimens): wing, 67–75 (70); tail, 45–47 (45.5); bill, 9–10.5 (10); tarsus, 14.5–15.5 (15.2).

Range. Temperate Zone, Andes of Ecuador, thence ranging to the upper part of the Subtropical Zone; also found in Central Peru and extreme northern Chile.

The present species is readily distinguished by its Remarks. generally deep coloration, more restricted yellow area of the tail, scarcely brighter rump-patch, and in particular by the restriction of the black hood on the sides of the head, and by the differently colored female. In all these respects, and also in its larger size, it differs from the form of S. peruanus which occurs in Ecuador. While the latter is recorded from certain points from which S. capitalis is also known, it does not go so high up. Nothing is on record regarding the local habitat of either form. S. capitalis is subject to much variation. Two males in the series examined (Nos. 168,133 and 176,274, Collection American Museum of Natural History) have the dark streaking above carried to an extreme, very much as in S. santæcrucis. Some males are uniform yellow below, with no trace of gravish posteriorly. In some the black throat is merely indicated, and one of those in this category (No. 236,588, Collection U. S. National Museum) has the crown merely brownish, obscurely streaked with greenish, scarcely contrasting with the back.

Cabanis described this species from a specimen without any more

definite locality than "Ecuador," comparing it with ictericus of Brazil. Through the courtesy of Dr. Erwin Stresemann this typespecimen is now before me. It is a mounted example in rather worn condition, clearly referable to the form above characterized. The name has been loosely and indiscriminately applied by subsequent authors, not only to the Ecuador bird, but to that of Peru as well, so that without actual examination of the specimens involved it is impossible to place some of the published records with any certainty. It would appear that Sharpe, when he worked up this group for the Catalogue of the Birds in the British Museum, misapplied the name capitalis to the Peruvian bird, which later (1894) came to be known as *peruanus*, and then described the present species as new, calling it sclateri. He was unquestionably misled by having in hand an individual without a defined black throat-patch (like the one referred to above), since his description of the male fits well otherwise, and the type-locality, Riobamba, is one from which we have several specimens. This observation has recently been confirmed by actual examination of Sharpe's type, for which I am indebted to Dr. C. E. Hellmayr. His description of the female, however, applies better to S. peruanus paulus, as indicated by the measurements, although Cuenca, the assigned locality, is represented in the series before me by a male of *capitalis*, collected by Fraser.

S. capitalis is best known as a bird of the Andes of Ecuador, but it reappears unchanged in central Peru, as shown by a number of specimens before me, some of which have served as the basis of published records. The most southern locality known is Putre, in extreme northern Chile, whence the Field Museum has two perfectly typical examples. Whether its range is actually, or only apparently, discontinuous we are not in a position to say.

Specimens examined. Ecuador: Quito, 6; Cuenca, 1; Mocha, 3; Mt. Chimborazo, 1; Valle de Cumbaza, Mt. Chimborazo, 1; Gualea, 1; Mt. Pichincha, 4; El Paso, Rio Charcay, near Nabon, Azuay, 1; Nono, 5; Papallacta, 1; Govinda, 1; "Guayaquil" (error), 1; Cumbaya (7500 ft.), 2; Riobamba to Cajabamba (10,000 ft.), 1; Riobamba to Luisa (9–10,000 ft.), 1; Riobamba, 1; Cechce, 1; unspecified, 2. Peru: Chinchao (5700 ft.), 1; Huanta, 1; Coracora, 2, Pauza, 1; Vitoc, La Garita del Sol, 1. Chile: Putre, Tacna, (11,600 ft.), 2. Total, 42.

Spinus crassirostris Landbeck.

Chrysomitris crassirostris LANDBECK, An. Univ. Chile, XLI, 1872, 102 (Mendoza, Argentina; nomen nudum).—LANDBECK, Zool. Garten, XVIII, 1877, 254 ("Hohen Cordillera, in der Nähe der Pässe von Uspallata und Portillo," Chile; orig. descr.; type in coll.—?).

Spinus ictericus magnirostris DABBENE, El Hornero, I, 1918, 121 (range), 181 (Sierra del Cajon [type-locality], Salta, and Laguna Blanca, Catamarca, Argentina; orig. descr.; type in coll. Mus. Buenos Aires).

Description. Adult male: above buffy olive, with obscure darker centers to the feathers, the nape a little brighter, more yellowish olive, the rump strontian yellow; head all around black; wings dusky black, the remiges with a broad basal band of lemon-yellow, wanting on the outer webs of the outermost two primaries; wing-coverts and inner secondaries with paler external margins; tail black, all the rectrices, except the middle pair, with the basal half or more yellow; sides of neck and under parts (except black throat) dull strontian yellow, more or less shaded with buffy, passing into grayish white posteriorly and into amber-yellow on the under tail- and wingcoverts; "iris brown"; bill and feet dark brown (in skin).

Adult female: above hair-brown, with faint darker centers to the feathers, passing into amber-yellow on the rump; upper tail-coverts like the back; tail dusky brown, all the rectrices, except the middle pair, with the basal half pale lemon-yellow; wings dusky brown, the remiges with a broad basal band of pale lemon-yellow, wanting on the outer webs of the outermost three primaries, which are narrowly margined externally with pale yellow; lesser and middle wing-coverts washed with pyrite-yellow, and greater coverts tipped with buffy white; under parts dark smoke-gray, fading into almost white on the under tail-coverts; lower abdomen sometimes with a touch of yellowish green; under wing-coverts and axillaries tinged with the same color; "iris brown; bill horn-color; feet black."

Measurements. Male (two specimens): wing, 79–80; tail, 50; bill, 13–13.5; depth of bill at base, 10.5–11; tarsus, 16–17. Female (four specimens): wing, 76–79 (average, 78); tail, 48–50 (49); bill, 13–13.5 (13.3); depth of bill at base, 10–11 (10.5); tarsus, 15.5–17 (16).

Range. Higher parts of northern Argentina, south along the Andes to central Chile (latitude 34°).

Remarks. Through the courtesy of Dr. Dabbene I have before me six specimens of this remarkable form, including the type of his *magnirostris.* He described it as a subspecies of *"ictericus"* (*i. e., magellanicus*), but it impresses me as a perfectly distinct and strongly marked species. Its large size, enormous bill, reduced amount of yellow (this color being entirely wanting on the wing-coverts), and differently colored female are all good specific characters, setting it

41

off from all the other forms in this generic group. The heavy bill, broad and deep at the base, is twice as bulky as that of *magellanicus*, and suggests how a bill like that of *Coccothraustes*, *Hesperiphona*, and *Eophona* may have been developed from some slender-billed type. The relationships of the species appear to lie with *S. capitalis*, as is shown by the color of the female, and which it probably replaces at the higher elevations in the Andean region of northern Argentina and adjacent parts of Chile. A specimen from Las Leones, Aconcagua, Chile, is marked as having been taken at an elevation of 1900 meters, but the others all come from higher up, 2800 to 3700 meters. Four specimens lately received by the American Museum of Natural History come from a locality lying at an elevation of 10,000 feet. One of these is a young male, much duller than the adults, soiled oliveyellow below, and without any black on the head.

Unfortunately Dr. Dabbene's name will have to give way to the earlier one applied by Landbeck in 1877, which has been completely overlooked by other authors. Landbeck's description is clearly applicable to this form and to no other, and the localities he gives are confirmed by the specimen from Chile referred to above. I am indebted to Dr. Charles W. Richmond for calling my attention to Landbeck's name and for a transcript of his description.

Specimens examined. Argentina: Sierra del Cajon (2800 m.), Salta, 2; Corral Quemado (3500 m.), Catamarca, 2; Lago Helada (3700 m.), Catamarca, 1; Puente del Inca (10,000 ft.), Argentina, 4. Chile: Las Leones (1900 m.), Aconcagua, 1. Total, 10.

Spinus cucullatus (Swainson).

- Fringilla cubæ GERVAIS, Mag. Zool., 1835, Cl. II, pl. 44 and text ("environs de Santiago," Cuba; orig. descr.; type in coll.—?)—GRAY, Gen. Birds, II, 1849, 371 (in list of species; ref. orig. descr.).—LEMBEYE, Aves Isl. Cuba, 1850, 130 (in list of species).—GUNDLACH, Journ. f. Orn., IV, 1856, 10 (Santiago de Cuba).—
- CABANIS, Journ. f. Orn., V, 1857, 241 (Cuba; Caracas, Venezuela; crit.).—GUND-LACH, Journ. f. Orn., VII, 1859, 295 (Bayamo, Cuba); IX, 1861, 412 (Cuba; crit.;= Pyrrhomitris cucullata Swainson); XIX, 1871, 282 (Cuba; crit.).
- Fringilla cucullata GRAY, Gen. Birds, II, 1849, 371 (in list of species; ref. orig. descr.).—GRAY, Hand-List Birds, II, 1870, 82 (in list of species; range ["Trinidad"]).

Pyrrhomitris cucullata BONAPARTE, Consp. Avium, I, 1850, 517 (Cumaná, Venezuela; diag.; references).—Gundlach, Orn. Cubana, 1876, 21 (Cuba, escaped from

Carduelis cucullata SWAINSON, Zool. Ill., I, 1820–21, pl. 7 and text ("Spanish Main," *i. e.*, N. coast of Venezuela; orig. descr.; type in coll.—?).

captivity).—GUNDLACH, Journ. f. Orn., XXII, 1874, 312, and XXVI, 1878, 160 (Porto Rico).—CORV, Auk, III, 1886, 207 (Cuba and Porto Rico, introduced; descr.; West Indian references).—CORV, Birds West Indies, 1889, 94 (Cuba and Porto Rico, introduced; descr.; references).—CORV, Cat. Birds West Indies, 1892, 111 (Cuba and Porto Rico, introduced).

- Chrysomitris cucullata LICHTENSTEIN, Nom. Avium Mus. Zool. Berolinensis, 1854, 46 (Venezuela).—SCLATER, Cat. Am. Birds, 1861, 123 ("Trinidad"; references). —CASSIN, Proc. Acad. Nat. Sci. Philadelphia, 1865, 91 ("Trinidad," "Cayenne," and Venezuela; references; plum.).—SCLATER and SALVIN, Proc. Zool. Soc. London, 1868, 167 (Carupano and Caracas, Venezuela).—FINSCH, Proc. Zool. Soc. London, 1870, 553 ("Trinidad," ex Sclater).—GIEBEL, Thes. Orn., I, 1872, 674 (references).—SCLATER and SALVIN, Nom. Avium Neotrop., 1873, 34 (Venezuela, in range).—CORV, List Birds W. Indies, rev. ed., 1886, 12 (Cuba, introduced).—SHARPE, Cat. Birds Brit. Mus., XII, 1888, 225 (Carupano and Caracas, Venezuela; "Trinidad"; Cuba; descr.; references).—DUBOIS, Syn. Avium, I, 1901, 593 (references; range).
- Pyrrhomitris cucullatus LAWRENCE, Ann. Lyc. Nat. Hist. N. Y., VII, 1860, 269 (Cuba; references; crit.).—GUNDLACH, Repert. Fisico-Nat. Cuba, I, 1866, 397 (Cuba, introduced from Caracas, Venezuela).
- Spinus cucullata CHAPMAN, Bull. Am. Mus. Nat. Hist., VI, 1894, 33 (Monos Island, Trinidad).
- Spinus cucullatus PHELPS, Auk, XIV, 1897, 364 (San Antonio, Venezuela).—
 RIDGWAY, Bull. U. S. Nat. Mus., No. 50, I, 1901, 104 (descr.; range; references).
 —HELLMAYR, Nov. Zool., XIII, 1906, 56 (Monos Island, Trinidad; Cumaná, Venezuela).—SHARPE, Hand-List Birds, V, 1909, 231 (in list of species; range).—
 BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).

Description. Adult male: above deep scarlet or light Brazil-red, with a brown wash, brightening on the rump and upper tail-coverts into grenadine-red; tail black, with concealed base salmon-orange; wings black, with a basal band of orange-chrome (wanting on the outer web of the outermost primary); lesser and median wing-coverts black basally, Brazil-red terminally; greater series black with scarlet tips; primary-coverts black; head all around and upper throat black; sides of neck and under surface grenadine-red, the abdomen white medially, the under tail- and wing-coverts paler (orange-chrome to salmon-orange); inner webs of remiges below light salmon-orange basally.

Female: above hair-brown, grayer (mouse-gray) on the pileum, the rump flame-scarlet, the longer upper tail-coverts like the back; tail dusky brown, with concealed base reddish; wings as in the male, but the red areas paler (salmon orange) and more restricted; under parts dull grayish white, palest posteriorly, with a band of flame-scarlet across the breast.

An example in juvenal plumage (No. 10,763, Collection Academy Natural Sciences of Philadelphia) is snuff-brown above, almost uniform, the wings and tail darker brown, the red areas of the adult indicated on the wings in cinnamon-buff; the under parts dull buffy.

Measurements. Male (four specimens): wing, 58-62 (60); tail, 35-37 (36); bill, 9-9.5 (9.3); tarsus, 11.5-12.5 (12). Female (one specimen): wing, 57; tail, 34; bill, 9; tarsus, 12.

Range. Arid Tropical Zone of the north coast of Venezuela, from Caracas east to Monos Island, Trinidad. Introduced into Cuba and Porto Rico.

Remarks. It is by no means sure that the female bird described above is in fully adult plumage; probably it is not, judging by comparison with Sharpe's description.

This is a very distinct species, in which red replaces the yellow of the other forms in this group. In size, proportions, and general color-pattern it is so similar to S. siemiradzkii that I have no doubt of their close relationship. (It will be noted, too, that *siemiradzkii* likewise comes from an arid region, the Guayaquil district of western Ecuador). Its known range is very restricted, being confined to the arid coast-region of northern Venezuela, not even reaching Trinidad (but only to Monos Island), the supposed records from that country all proving to be based on skins of "Orinoco" make. Swainson's figure and description were based on an example which must have come from some part of this region, and I therefore propose to take Cumaná, Venezuela, as the type-locality. Fringilla cubæ Gervais is the only synonym; it was based on a specimen taken in Cuba, where according to Gundlach the species was introduced years ago as a cage bird, escaping from captivity. (Not all the West Indian references appear in the above list).

Specimens examined. Monos Island, 1; "Trinidad," 4; San Antonio, Venezuela, 1; "Orinoco," 1; unspecified, 2. Total, 9.

Spinus siemiradzkii (von Berlepsch and Taczanowski).

- Chrysomitris siemiradzkii VON BERLEPSCH and TACZANOWSKI, Proc. Zool. Soc. London, 1883, 536, 551, pl. 50 (Guayaquil, Ecuador; orig. descr.; type in coll. Warsaw Mus.); 1884, 282 (Guayaquil, Ecuador); 1885, 121 (range).—REICHENOW and SCHALOW, JOURN. f. ORN., XXXIV, 1886, 106 (reprint orig. descr.).—TACZA-NOWSKI, ORN. Perou, III, 1886, 50, Tables, 86 (Tumbez, Peru, and Guayaquil, Ecuador; descr.; crit.).—SHARPE, Cat. Birds Brit. Mus., XII, 1888, 221 (Balzar Mountains, Ecuador; descr.; references).—DUBOIS, Syn. Avium, I, 1901, 592 (ref. orig. descr.; range).
- Chrysomitris magellanica siemiradzkii LYNCH-ARRIBALZAGA, An. Mus. Nac. Buenos Aires, (3), I, 1902, 166 (range).
- Spinus siemeradzkii SHARPE, Hand-List Birds, V, 1909, 232 (in list of species; range).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 374 (ref. orig. descr.; range).

Description. Adult male: above aniline-yellow, brightening into light cadmium on the nape and rump; head black all around; tail black, with yellow base (concealed); wings black, with a broad basal band of lemon-chrome (wanting on the outer web of the outermost primary), the inner secondaries margined externally with grayish white or yellowish toward their tips; wing-coverts tipped with anilineyellow, the greater series with light cadmium; under parts (except black throat) uniform light cadmium; under wing-coverts yellow, with a patch of grayish; iris "brun foncé"; bill and feet (in skin) brownish.

Adult female not seen, but described as "yellowish olive above, the rump more yellowish; beneath soiled greenish yellow, the middle of the abdomen whitish; wings and tail similar to those of the male, but the colors duller" (translation).

Measurements. Adult male (four specimens): wing, 55-59 (average, 56.5); tail, 32-33 (33); bill, 9.5-10 (9.6); tarsus, 12.5-13.5 (13).

Range. Arid Tropical' Zone of western Ecuador (including Puna Island) and extreme northwestern Peru.

Remarks. The plate accompanying the original description shows the bird a little too dark on the back, the color being of a more golden hue. The species is a very distinct one, readily distinguished by its bright coloration and relatively much shorter tail, which is scarcely more than one-half the length of the wing. This latter feature it shares with *S. cucullatus* and *S. longirostris*.

M. Stolzmann found it abundant in the neighborhood of Tumbez, Peru, but confused it with "*Ch. capitalis*" (i. e., *S. peruanus peruanus*), and so did not trouble to secure specimens. It remained for a geologist, Dr. Joseph Siemiradzki, to collect a small series near Guayaquil, in Ecuador, which fell into the hands of von Berlepsch and Taczanowski, who described it as a new species, naming it after its discoverer. It is a form peculiar to the Arid Tropical belt which occupies this part of Ecuador, extending southward into Peru. The specimen from Cuenca, Ecuador, referred to this form on the authority of Sclater, belongs to some other species.

Specimens examined. Ecuador: Guayaquil, 3 (including the type); Puna Island, 1. Total, 4.

Spinus longirostris (Sharpe).

Chrysomitris icterica (not Fringilla icterica Lichtenstein) SALVIN, Ibis, 1885, 217, excl. extralimital localities and references (Mount Roraima, 3500 ft., British Guiana).—PENARD, Vog. Guyana, II, 1910, 400 (Guiana; descr.; habits).

[Chrysomitris icterica] Subsp. γ , Chrysomitris longirostris SHARPE, Cat. Birds Brit. Mus., XII, 1888, 220, excl. syn. part (Mount Roraima, British Guiana; orig. descr.; types in coll. Brit. Mus.).

Chrysomitris icterica var. longirostris DUBOIS, Syn. Avium, I, 1901, 592, excl. syn. part (ref. orig. descr.; range).

Chrysomitris magellanica typica LYNCH-ARRIBALZAGA, An. Mus. Nac. Buenos Aires, (3), I, 1902, 166 (Guianas; crit.).

Spinus longirostris SHARPE, Hand-List Birds, V, 1909, 232 (in list of species; range).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 374 (ref. orig. descr.; range).

Description. Adult male: above warbler-green, passing into lemonchrome on the rump and into sulphine-yellow on the upper tailcoverts; tail black, with concealed base lemon-yellow; wings black, with a basal band of lemon-yellow (wanting on the outer web of the outermost primary); secondaries with rather narrow external terminal margins of warbler-green, inclining to whitish terminally; greater wing-coverts with a broad subterminal black band and lemon-chrome tips; lesser-coverts tipped with warbler-green; primary-coverts black; head black all around, this color not extended over the lower throat; below, from the throat down, bright wax-yellow, paler (strontian yellow) posteriorly; inner margins of remiges pale yellow; bill and feet horn-color (in skin).

Adult female similar in general to the male, but duller, and lacking the black head, this being colored to correspond with the upper and under parts respectively.

Juvenal dress: resembles the adult female, but duller and more buffy; wings brownish.

Measurements. Male (four specimens): wing, 59–62 (average, 60); tail, 36–40 (37.5); bill, 11–11.5 (11.1); tarsus, 12–12.5 (12.2). Female (one specimen): wing, 62; tail, 39; bill, 11.5; tarsus, 12.5.

Range. Highlands of British Guiana.

Remarks. An example in juvenal dress is dated November 17, and another in postjuvenal moult December 6. Males still showing remains of the juvenal plumage are dated November 30, January 7 and 18. The entire series examined, although now distributed among several different institutions, were all collected by Whitely on or near Mount Roraima in British Guiana, and were referred to the Brazilian *ictericus* by Salvin when he worked up Whitely's collections from that region. Sharpe pointed out their distinctive characters in 1888, undertaking to show that they were intermediate between *ictericus* and *siemiradzkii*, a geographical impossibility. While the present form somewhat resembles *ictericus* in the general tone of its coloration, its characters, as well as its isolated and restricted range, suggest that it should be treated as a distinct species, rather than as a race of *S. magellanicus*.

Specimens examined. British Guiana: Mount Roraima, 10; Quonga, 1. Total, 11.

Spinus olivaceus (von Berlepsch and Stolzmann).

Spinus olivaceus von BERLEPSCH and STOLZMANN, Ibis, 1894, 387 (Vitoc [typelocality], Garita del Sol, and Huayabamba, Peru; orig. descr.; type in coll. Warsaw Mus.).—von BERLEPSCH and STOLZMANN, Proc. Zool. Soc. London, 1896, 323, 353 (Garita del Sol, Peru).—SHARPE, Hand-List Birds, V, 1909, 232 (ref. orig. descr.; range).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).

Chrysomitris olivacea DUBOIS, Syn. Avium, I, 1901, 592 (ref. orig. descr.; range). Description. Adult male: above deep warbler-green, obscurely mottled with darker centers to the feathers, becoming rather brighter and more yellowish on the rump; head all around black; tail black, with concealed base yellow (lemon-yellow or lemon-chrome); wings black, the remiges with a basal band of lemon-chrome (wanting on the outermost primary), the tertiaries with narrow and inconspicuous grayish green terminal outer margins; primary-coverts and wingcoverts black, the latter with yellowish green tips like the back, those of the greater series forming a conspicuous band across the wing; under parts in general (except black throat) dull yellow, strongly shaded with saffron or brownish, the under tail-coverts rather brighter and purer yellow; "iris brown; bill black, basally blue-gray below; feet slate-color."

Female similar, but duller colored, and without the black hood, these parts being colored to correspond with the upper and under surfaces respectively; the yellow areas of the wings and tail on the average more restricted; the under parts are bright warbler-green, the abdomen medially and the under tail-coverts brighter and more yellowish; colors of the soft parts like those of the male. A supposed young bird of this species closely resembles the adult female, but is duller still.

Measurements. Male: wing, 62–67 (average, 64); tail, 35–38 (37); bill, 9–10 (9.5); tarsus, 12.5–13 (13). Female (three specimens): wing, 60–64 (62); tail, 35–37 (36); bill, 8–9 (8.7); tarsus, 12–13 (12.3).

Range. Subtropical Zone, on the eastern or Amazonian slope of the Andes of Ecuador, Peru, and Bolivia.

Remarks. The present form is obviously specifically distinct, and may readily be distinguished by the decidedly *brownish* tone of its general coloration as compared with that of its congeners, and furthermore by the restriction of the paler margins of the tertiaries to a narrow fringe, inconspicuous even in fresh plumage. This is a marked and constant feature, and is not dependent upon stage of wear. Another apparently good character is the lessened emargination of the tail, and the relative shortness of this member (little more than half the wing).
In describing this form von Berlepsch and Stolzmann compared it primarily with S. capitalis, but its relationships are hardly with that form. In the brownish tone of its general coloration it suggests S. notatus notatus; in its form and proportions it resembles S. siemiradzkii; and its color-pattern is that of the black-hooded group. I have already suggested that it may be the Subtropical Zone representative of the short-tailed section of the latter group. All the localities from which it has thus far been reported lie on the eastern or Amazonian side of the Andes, although none of them appear to be over 6500 feet in elevation. At some of these localities it occurs together with forms of S. magellanicus.

Specimens examined. Ecuador: Zamora, 3250 ft., 1. Peru: Vista Alegre, 2; Marcapata, Cuzco, 1; Huayabamba, 2; Vitoc, La Garita del Sol, 2. Bolivia: Songo, 4; San Antonio, 2; Yungas de Cochabamba, 2. Total, 16.

Spinus santæcrucis, sp. nov.

Type, No. 80,733, Collection Carnegie Museum, adult male; Samaipata, Bolivia, November 13, 1919; José Steinbach.

Description. Similar in general to Spinus magellanicus bolivianus, but decidedly smaller, and much darker in coloration above. Adult male: above light olive-green, heavily mottled with black centers to the feathers, the rump rather lighter, more yellowish, and more uniform, the upper tail-coverts like the back; the wing-coverts mostly black, tipped with pyrite-yellow; otherwise mainly as in bolivianus, *i. e.*, head all around and throat black; rest of under parts lemonchrome, the tibiæ and sometimes the lower abdomen medially grayish or whitish; wings and tail black, crossed with a broad basal band of yellow, omitted on the middle pair of rectrices and on the outer web of the outermost primary; tertials broadly margined externally with yellowish or whitish toward their tips; "iris brown; bill black, base plumbeous; feet black or plumbeous."

Two apparently adult females are not certainly distinguishable from those of *bolivianus* except by their markedly smaller size. A younger bird (No. 78,993, Collection Carnegie Museum) is very dark green above and dull grayish white below, with scarcely any greenish or yellowish shade.

Measurements. Male (seven specimens): wing, 66-71 (average, 69); tail, 42-45 (43.5); bill, 9.5-10 (9.7); tarsus, 13-14 (13.5). Female (two specimens): wing, 65-70; tail, 39-42; bill, 9.5; tarsus, 13.5-14.

Range. Tropical Zone, eastern foothills of the Andes, Province of Santa Cruz, Bolivia.

Remarks. The specimen selected as the type is a bird in fresh plumage, the outermost primaries not quite fully grown. The description of the male applies to those in perfect plumage, but certain examples of this sex, which I refer to this form, are no more suffused with blackish above than the average specimen of *bolivianus*, from which they differ, however, in smaller size.

The smaller size and conspicuously darker coloration of the upper parts serve to distinguish this form from S. magellanicus bolivianus, at least when specimens in the same stage are compared. The differences stand out so well in series that I prefer to rank santæcrucis as a distinct species. In fact, it suggests S. uropygialis in the amount and intensity of the black of the upper parts, which merges directly into that of the pileum, without contrast. From S. magellanicus alleni, which is found in the same region, and with which it agrees in size, it may at once be told by its conspicuously darker coloration. On geographical grounds it therefore cannot be considered as subspecifically related to either bolivianus or alleni, and although it is quite possibly a variant of the latter, its characters are such that it seems best to regard it as a full species, as already said. So far as known its range is restricted to the country along the eastern foothills of the Andes in the Province of Santa Cruz, Bolivia, from 400 up to 1400 meters above sea-level.

Specimens examined. Bolivia: Santa Cruz de la Sierra, 2; Rio Surutu (near Buenavista); 6; Rio Yapacani (near Buenavista), 1; Buenavista, 2; Cerro Hosane, 1; Samaipata, 1; Holguin, 1; Vallegrande, 1. Total, 15.

Spinus peruanus peruanus von Berlepsch and Stolzmann.

Fringilla magellanica (not of Vieillot) WIED, Beiträge Naturg. Brasilien, III, i, 1830, 620, part (Lima, Peru, ex Lesson).

- Chrysomitris magellanica TSCHUDI and CABANIS, Fauna Peruana, Orn., 1845–6, 220 (Peru; descr.).
- Chrysomilris capitalis (not of Cabanis) SCLATER and SALVIN, Proc. Zool. Soc. London, 1867, 985 (Islay and Arequipa, Peru); 1868, 569 (W. Peru); 1869, 597 (Cosnipata, Peru).—TACZANOWSKI, Proc. Zool. Soc. London, 1874, 522 (Lima, Huanta, and Ropaybamba, Peru).—TACZANOWSKI, Orn. Perou, III, 1886, 49, part, Tables, 86, part (Chirimoto, Lima, Huanta, Ropaybamba, Amable Maria, Pumamarca, and Palca, Peru; descr.; Peruvian references; habits).—SHARPE, Cat. Birds Brit. Mus., XII, 1888, 219, part (Arequipa, Islay, Ropaybamba, and Callao, Peru; descr.; Peruvian references).—von BERLEPSCH and STOLZMANN, Proc. Zool. Soc. London, 1892, 377 (Lima and Ica, Peru; crit.).

Fringilla capitalis GRAY, Hand-List Birds, II, 1870, 81 (Peru; in list of species).

Chrysomitris barbata (not Fringilla barbata Molina) SALVIN, Proc. Zool. Soc. London, 1883, 422 (Callao, Peru).

- Spinus ictericus peruanus VON BERLEPSCH and STOLZMANN, Ibis, 1894, 388, in text (Garita del Sol, Peru).—VON BERLEPSCH and STOLZMANN, Proc. Zool. Soc. London, 1896, 352 (La Merced [type-locality], Garita del Sol, Lima, and Ica, Peru; orig. descr.; type in coll. Warsaw Mus.).—VON BERLEPSCH and TACZA-NOWSKI, Proc. Zool. Soc. London, 1902, 60 (Chanchamayo, Peru).—VON BER-LEPSCH and STOLZMANN, Ornis, XIII, 1905, 111 (Huaynapata, Peru).—CHAP-MAN, Bull. U. S. Nat. Mus., No. 117, 1921, 110, part (Lima, San Fernando, Matchi Picchu, and Pisac, Peru; crit.).
- Spinus sclateri (not Chrysomitris sclateri Sharpe) VON BERLEPSCH and STOLZMANN, Proc. Zool. Soc. London, 1896, 353, part (Garita del Sol, Peru; crit.).
- Chrysomitris icterica var. peruana DUBOIS, Syn. Avium, I, 1901, 592 (ref. orig. descr.; range).

Spinus peruanus SHARPE, Hand-List Birds, V, 1909, 231 (ref. orig. descr.; range).— BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).

Description. Adult male: above warbler-green, more or less mottled with dark centers to the feathers, inclining to yellowish on the rump (sometimes lemon-yellow); head all around and throat black; tail black, with basal band lemon-yellow, wanting on the outer web of the outermost primary; secondaries narrowly tipped with white, and tertiaries widely margined externally with grayish white, more or less tinged with greenish yellow; lesser and middle wing-coverts black, tipped with warbler-green; greater series black, tipped with empireyellow or olive-ocher; sides of neck and rest of under parts bright lemon-chrome, the abdomen and tibiæ sometimes showing a little whitish; under wing-coverts similar but paler; the outermost partly gray; bill horn-color; feet dusky (in skin).

Female, perfect plumage: similar to the male, but duller, darker warbler-green above, the head and usually the rump concolor with the back; the yellow of the wings and tail duller and more restricted; margins of the tertiaries grayish white, without any greenish yellow tinge; under parts dull yellow (between strontian yellow and oliveyellow), paler posteriorly, the chin sometimes grayish.

Female, imperfect plumage: much duller and darker above (olivecitrine or yellowish olive), and paler, dull gravish white, below.

In juvenal plumage the species resembles its allies in being brownish above and dull yellowish below, strongly suffused with buffy, with prominent wing-edgings of buffy.

Measurements. Male: wing, 67–71 (average, 69); tail, 41–45 (43); bill, 9.5–11 (10.5); tarsus, 14.5–15.5 (15). Female: wing, 64–70 (67.5); tail, 40–45 (42.5); bill, 9.5–10.5 (10); tarsus, 13.5–15 (14.5).

Range. From northern Peru (Department of Catamarca) southeastward to northern Chile (Province of Tacna).

Remarks. The excellent series of this form examined in this connection show that it is subject to considerable variation. It is a bright-

colored form, with conspicuous light outer edgings to the tertiaries in the male, while the female in perfect plumage is as richly yellow below as the same sex of *alleni*, from which it may readily be distinguished by the whiter and wider outer margins of the tertiaries. Males vary with regard to the amount of dark mottling on the back and of yellow on the rump, the extent of basal yellow on the middle rectrices, and the extent of the black on the throat, this being irregularly developed in several individuals.

So far as I can discover, specimens from the northern and southern extremities of the range are precisely like those from the type-locality. But the extraordinary thing about this form is that it ranges from sea-level to an altitude of at least 12,400 feet in the Department of Junin (Chipa), specimens from these extremes being absolutely the same. There is nothing in the dates of collection to indicate that this is due to an altitudinal migratory movement, unless on the supposition that the breeding season is most irregular. We have here, then, a case of a Passerine bird which ranges through three life-zones in the tropics, and is apparently at home in each.

La Merced, in the Department of Junin, is the type-locality for peruanus, which was described as somewhat intermediate between ictericus and capitalis, most of the Peruvian records having been put under the latter name down to 1896. Specimens from the typelocality agree closely with the description, but five birds from Oroya, on the Rio Mantaro, although considerably worn, are larger and darker, and seem clearly referable to the form of magellanicus which has been described from the Urubamba Valley. But specimens from near San Miguel Bridge in the latter region are certainly peruanus, as also is one example from Pisac, higher up, while three others from this latter place are just as certainly the Urubamba form. Since the two occur together, they cannot well be considered races of the same species, and after carefully going over the difficult situation thus exposed I have decided to recognize *peruanus* as a full species, while at the same time admitting its close relationship to S. magellanicus alleni, of which it may indeed be the Andean representative.

Specimens examined. Peru: Macate, 3; Trujillo, 1; Vista Alegre, 2; Matucana, 1; Santa Eulalia, 2; Vitarte, 4; Lima, 8; Chanchamayo, 1; Pisac, 1; Cosnipata, 1; Islay, 1; Yca, 2; La Merced, 7; Marcapata, Cuzco, 2; Pacasmayo, 1; Huaracondo Cañon (10,000 ft.), 1; Limbani, 3; Huaral, 10; Huacho, 4; San Fernando (4500 ft.), Rio San Miguel,

1; Matchi Picchu (6000 ft.), San Miguel Bridge, 1; Acobamba, Junin, 2; Perene, Junin, 2; Utcuyacu, Junin, 3; Pisco, Ica, 1; Cocachacra, Arequipa, 5; Chipa (12,400–14,000 ft.), Junin, 5; Tambo Valley, 1; Ropaybamba, 1; Huaynapata, Marcapata, 2; Vitoc, La Garita del Sol, 2; unspecified, 2. Total, 83.

Spinus peruanus paulus, subsp. nov.

- Chrysomitris icterica (not Fringilla icterica Lichtenstein) SCLATER, Proc. Zool. Soc. London, 1860, 66 (Pallatanga, Ecuador).—SCLATER, Cat. Am. Birds, 1861, 125, part (Cuenca, Ecuador).
- Chrysomitris capitalis (not of Cabanis) (?) TACZANOWSKI, Proc. Zool. Soc. London, 1879, 230 (Tambillo, Peru); 1880, 199 (Cutervo, Peru); 1882, 17 (Chirimoto, Peru; descr. egg).—(?) VON BERLEPSCH and TACZANOWSKI, Proc. Zool. Soc. London, 1883, 551 (Sarayacu, Ecuador; crit.); 1884, 294 (Cayandeled and Cechce, Ecuador; crit.), 313, in text (Pallatanga, Ecuador).—(?) TACZANOWSKI, Orn. Perou, III, 1886, 49, part; Tables, 86, part (Tambillo and Cutervo, Peru).— SHARPE, Cat. Birds Brit. Mus., XII, 1888, 219, part (Jima and Sical, Ecuador). SALVADORI and FESTA, Boll. Mus. Zool. ed Anat. comp. Torino, XV, No. 357, 1899, 27, part (Cuenca, Ecuador; crit.).
- Chrysomitris siemiradzkii (not of von Berlepsch and Taczanowski, 1883) von BERLEPSCH and TACZANOWSKI, Proc. Zool. Soc. London, 1884, 313 (Cuenca, Ecuador).
- (?) Chrysomitris sclateri SHARPE, Cat. Birds Brit. Mus., XII, 1888, 200, part (Cuenca, Ecuador; descr. female).
- Spinus iclericus peruanus (not of von Berlepsch and Stolzmann) BANGS and NOBLE, Auk, XXXV, 1918, 461 (Bellavista and Huancabamba, Peru; crit.).

Type, No. 168,124, Collection American Museum of Natural History, adult male; Zamora (3250 ft.), Loja, Ecuador, November 29, 1920; George K. Cherrie.

Subspecific characters. Similar to S. peruanus peruanus, but decidedly smaller, and female averaging duller, less yellowish, below.

Measurements. Male: wing, 62–67 (average, 64-5); tail, 38–42 (40); bill, 10–10.5 (10.2); tarsus, 13–15 (14). Female (six specimens): wing, 59–66 (62.5); tail, 35–42 (39.5); bill, 10-10.5 (10.2); tarsus, 13–14 (13.5).

Range. Andean region of southern Ecuador and northern Peru. Remarks. This is merely a small edition of S. peruanus peruanus, with which it doubtless intergrades to the southward. It runs through the same variations as that form, and adult males are fully as brightly colored, while females seem to average a little duller. Several examples in buffy yellow juvenal dress are dated July 5, 10, 13, and September 3.

Without access to the specimens upon which the above references

are based it is impossible to allocate all of them satisfactorily, as more than one form may be involved. Such of the specimens now before me as authorities have ventured to name have likewise been referred to several different forms. The present bird, however, need not be confused with S. siemiradzkii, which is smaller and still more brightly colored, and moreover occupies a different faunal area, being confined to the Arid Tropical Zone in Ecuador. From S. capitalis it differs in its smaller size, brighter coloration, more extensive black (normally) on the sides of the head, yellow bases of the middle rectrices (normally), and differently colored female. Although there are certain places in Ecuador represented by specimens of both capitalis and paulus, there are none for the latter above 9200 feet, while capitalis ranges much higher up. Even where both species are found, there is as yet nothing to show that they actually occur side by side. Since capitalis is known to range southward through Peru, there is a possibility that some of the records above cited may really belong to that form, and not to *paulus*. But all the specimens I have seen from northern Peru, from localities on the Amazonian slope of the Andes, appear to be *paulus*.

Specimens examined. Ecuador: Calasnique, I; Cayandeled, I; Alamor (4350 ft.), Loja, 4; Portovelo (2000–2700 ft.), Oro, I; Zamora (3250 ft.), Loja, 4; Punta Santa Ana (3650–4500 ft.), Portovelo-Loja trail, Oro, I; El Paso (9200 ft.), Rio Charcay, near Nabon, Azuay, 9; Bucay (1000 ft.), Chimbo, I; Mapoto, 2; Pallatanga, I; Chunchi (5500 ft.), I; Junction Chanchan and Chiguancay Rivers (2500 ft.), 2; Huigra (4000 ft.), 4; "Quito," I. Peru: Milagros (2200 ft.), 2; Huancabamba (6500 ft.), Piura, 10; Palambla, Piura, 4; Bellavista, I; Tambillo, I. Total, 5I.

Spinus magellanicus alleni Ridgway.

"Gafarron" AZARA, Apunt., I, 1802, 483, part, and Voy. Am. Mér., III, 1809, 292, part (Paraguay).

Chrysomitris magellanicus (not Fringilla magellanica Vieillot) LAFRESNAYE and D'ORBIGNY, Mag. de Zool., 1837, Syn. Avium, 83, excl. syn. (Chiquitos, Bolivia).

Chrysomitris icterica (not Fringilla icterica Lichtenstein) REINHARDT, Vidensk. Med. Nat. For. Kjobenhavn, 1870, 403, part (Catalão, Goyaz, Brazil).—SALVIN, Ibis, 1885, 217, part (Bahia, Brazil).—VON BERLEPSCH, Journ. f. Orn., XXXV, 1887, 116 (Paraguay, ex Azara).—KERR, Ibis, 1892, 126 (Fortin Page, lower Pilcomayo, Paraguay).—SALVADORI, Boll. Mus. Zool. ed Anat. comp. Torino, X, No. 208, 1895, 7, part (Luque and Colonia Risso, Paraguay).—BERTONI, An. Cien. Paraguayos, I, 1901, 197 (Azara's reference).—von Ihering, Rev. Mus. Paulista, VI, 1904, 322 (Paraguay).

Chrysomitris magellanica BURMEISTER, Th. Brasilien, III, 1856, 255, part (Campos region of Brazil).—SCLATER and SALVIN, Proc. Zool. Soc. London, 1879, 607 (Prov. Chiquitos, Bolivia, ex Lafresnaye and D'Orbigny).

- Spinus yarrelli (not Carduelis yarrellii Audubon) ALLEN, Bull. Am. Mus. Nat. Hist., III, 1891, 375 (Chapada, Matto Grosso, Brazil).
- Spinus alleni RIDGWAY, Auk, XVI, 1899, 37 (Chapada, Matto Grosso, Brazil; orig. descr.; type in coll. Am. Mus. Nat. Hist.).—SHARPE, Hand-List Birds, V, 1909, 231 (ref. orig. descr.; range).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).
- Chrysomitris icterica var. alleni DUBOIS, Syn. Avium, I, 1901, 592 (ref. orig. descr.; range).
- Spinus ictericus alleni HELLMAYR, Abhand, K. Bayerischen Akad. Wiss., II Kl., XXII, 1906, 681, in text, 718, in text (Bahia, Goiaz, and Chapada, Brazil; Chiquitos, Bolivia; crit.).—von IHERING, Aves Brazil, 1907, 380 (references; range).—HELLMAYR, Nov. Zool., XV, 1908, 33 (Rio Thesouras, Rio Araguaya, Bahia, and Chapada, Brazil; Chiquitos, Bolivia; crit.).
- Chrysomitris icterica alleni REISER, Denks. K. Akad. Wiss., Math.-Nat. Kl., LXXVI, 1910, 81 (Facenda da Serra von Rio Grande and Paranaguá, Brazil).

Carduelis icterica BERTONI, Fauna Paraguaya, 1914, 63 (Rio Paraná, Paraguay).

Spinus ictericus LYNCH-ARRIBALZAGA, El Hornero, II, 1920, 97 ([Resistencia], Chaco, Argentina).

Subspecific characters. Similar to S. magellanicus magellanicus, but smaller, male brighter, purer yellow beneath, and black of throat more restricted. Female also differs in a corresponding manner.

Measurements. Male: wing, 64–69 (average, 67); tail, 40–43 (41.5); bill, 9.5–10.5 (9.7); tarsus, 13–13.5 (13.2). Female: wing, 64–69 (66); tail, 37–43 (40.5); bill, 9.5–10 (9.7); tarsus, 13–14 (13.5).

Range. Campos region of central Brazil (States of Bahia, Goyaz, and Matto Grosso) and eastern Bolivia, southward through Paraguay (except eastern part) to the Argentine Chaco.

Remarks. The Spinus of the campos region of Brazil has an extensive range, roughly triangular in outline, from the foothills of the Andes in Bolivia to within a few miles of the coast at Bahia, and thence southward to northeastern Argentina, but omitting the States in southeastern and southern Brazil. It is readily separable from true magellanicus by its smaller size and generally brighter, purer coloration, and from *ictericus*, which it resembles in size, by its paler colors throughout. The yellow of the under parts is lemon-yellow in the adult male, or near that shade, and duller yellow (between lemonyellow and oil-yellow) in the adult female, shaded on the throat with pyrite-yellow, and paler posteriorly, the color being lighter and purer than in the same sex of magellanicus and *ictericus*. They vary

greatly, however, those in imperfect plumage being grayish white below, shaded with pyrite-yellow anteriorly and laterally.

There is a possibility that the earliest name for this form is *Fringilla campestris* of Spix, 1825, based on the bird from the region around Diamantina, in the State of Minas Geraës. Dr. Hellmayr, who examined the type-specimen some years ago, remarked on its brighter and purer coloration as compared with other specimens from the same State, and suggested that the latter (representing *ictericus*) must have come from the forest region. He was unwilling to make a formal change in the names without seeing a larger series from Diamantina, and I find myself in the same position. A small series from Lagoa Santa, about one hundred miles to the southward, are clearly referable to *ictericus*, and on the principle that a certainty is better than an uncertainty I prefer to retain *alleni* as the name to be used, until more evidence is forthcoming on the status of *campestris*.

Specimens examined. Bolivia: Santa Cruz de la Sierra, 5; Portrero de Basilio, 2; Buenavista, 1; Rio Surutu, 1; Rio Quisera, 2. Brazil: Chapada, Matto Grosso, 5. Paraguay: Fort Wheeler, Paraguayan Chaco, 1; Puerto Pinasco, Rio Paraguay, 3; Bernalcué, I. Argentina: Avia Terai, Chaco, 7. Total, 28.

Spinus magellanicus ictericus (Lichtenstein).

- Fringilla magellanica (not of Vieillot) WIED, Reise nach Brasilien, II, 1821, 179 (southern Bahia, Brazil).—WIED, Beiträge Naturg. Brasilien, III, i, 1830, 620, part (Bahia and Minas Geraes, Brazil; descr.; references; crit.).—AUDUBON, Birds Am., 1839, pl. 394, fig. 2; Orn. Biog., V, 1839, 46 (Henderson, Kentucky; descr.).
- Fringilla icterica LICHTENSTEIN, Verz. Doubl., 1823, 26 (São Paulo, Brazil; orig. descr.; type in coll. Berlin Mus.).
- (?) Fringilla campestris SPIX, Aves Brasiliæ, II, 1825, 48, pl. 61, fig. 3 ("Habitat in campis districti adamantini"; orig. descr.; type in coll. Mus. Munich).— GRAY, Gen. Birds, II, 1849, 371 (in list of species; ref. orig. descr.).
- Carduelis magellanicus AUDUBON, Syn. Birds N. Am., 1839, 116 (Henderson, Kentucky; descr.).—AUDUBON, Birds Am., 8vo. ed., III, 1841, 133, pl. 182 (Henderson, Kentucky; descr.).
- Chrysomitris magellanica BONAPARTE, Geog. and Comp. List Birds Europe and N. Am., "1838," 33 (Audubon's reference).—BONAPARTE, Consp. Avium, I, 1850, 516, excl. syn. part (São Paulo, Brazil; diag.).—CABANIS, Mus. Heineanum, I, 1851, 160, excl. syn. part (Brazil; references).—BURMEISTER, Th. Brasilien, III, 1856, 255, part (Lagoa Santa and Congonhas, Brazil; descr.; references; habits).—CASSIN, Proc. Acad. Nat. Sci. Philadelphia, 1865, 92, part (South

America; crit.; references).—SALVIN, Cat. Strickland Coll., 1882, 213, part (Brazil; references; crit.).—Heine and Reichenow, Nom. Mus. Heineani Orn., 1882, 93 (Brazil).

- Chrysomitris icterica LICHTENSTEIN, Nom. Avium Mus. Zool. Berolinensis, 1854, 46 (Brazil).-SCLATER, Cat. Am. Birds, 1861, 125, part (Brazil).-von Pelzeln, Orn. Brasiliens, iii, 1870, 231 (Mattodentro, Ypanema, Jaguaraiba, and Ytarare, Brazil), 440 (Brazilian localities).-REINHARDT, Vidensk. Med. Nat. For. Kjobenhavn, 1870, 403, part (Lagoa Santa and Olaria [near Mariana], Brazil; habits).---VON BERLEPSCH and VON IHERING, Zeits. Ges. Orn., II, 1885, 102, 124 (Taquara do Mundo Novo, Rio Grande do Sul, Brazil) .- SHARPE, Cat. Birds Brit. Mus., XII, 1888, 217, part (Pelotas and São Paulo, Brazil).-GœLDI, Aves Brazil, 1894, 306 (Organ Mountains, Brazil; range; habits).-BUTLER, Foreign Finches in Captivity, 1894, 44, part (Brazil; habits, etc.).-SALVADORI, Boll. Mus. Zool. ed Anat. comp. Torino, X, No. 208, 1895, 7, part (Villa Rica, Paraguay).-KENIGSWALD, Journ. f. Orn., XLIV, 1896, 353 (Estado de São Paulo, Brazil; references, part).--VON IHERING, Rev. Mus. Paulista, III, 1898, 163, excl. extralimital localities and references (Iguape, São Paulo, Brazil) .- von IHERING, Ibis, 1901, 12 (Therezopolis, Brazil, ex Gældi).-Dubois, Syn. Avium, I, 1901, 592, part (references; range).—HAGMANN, Bol. Mus. Gœldi, IV, 1904, 14 (Spix's reference), 21 (Wied's reference), 58 (Burmeister's reference), 98 (von Pelzeln's reference).—CHUBB, Ibis, 1910, 635 (Sapucay, Paraguay; references).
- Chrysomitris magellanicus BAIRD, Rept. Pacific R. R. Surveys, IX, 1858, 418 (diag.), 419 (descr.; references; crit.).—Allen, Bull. Nuttall Orn. Club, V, 1880, 88 (crit. on range).
- Chrysomitris barbata (not Fringilla barbata Molina) SCLATER and SALVIN, Nom. Avium Neotrop., 1873, 34 (range).—WHITE, Proc. Zool. Soc. London, 1882, 600, part (Concepcion, Misiones, and Santo Tome, Corrientes, Argentina).
- Chrysomitris notata (not Carduelis notata DuBus) BAIRD, BREWER, and RIDGWAY, Hist. N. Am. Birds, I, 1874, 471, in text (Audubon's record; crit.).—RIDGWAY, Proc. U. S. Nat. Mus., III, 1880, 177, and Bull. U. S. Nat. Mus., No. 21, 1881, 22 (in list of N. Am. birds).
- Spinus notatus STEJNEGER, Auk, I, 1884, 362 (in list of N. Am. birds).—AMERICAN ORNITHOLOGISTS' UNION COMMITTEE, Check-List N. Am. Birds, 1886, 262; ed. 2, 1895, 219; ed. 3, 1910, 250 (Audubon's record).
- Astragalinus notatus Coues, Key N. Am. Birds, ed. 2, 1884, 356 (Audubon's record).
- Spinus ictericus von Ihering, Rev. Mus. Paulista, IV, 1900, 213 (Brazil; descr. eggs); V, 1902, 304 (faunal range), 311 (Estado de São Paulo, Brazil).—MIRANDA RIBEIRO, Arch. Mus. Nac. Rio de Janeiro, XIII, 1905, 186 (Retiro do Ramos, Itatiaya, Brazil).—von Ihering, Aves Brazil, 1907, 380, excl. range, part (Brazilian localities and range).—LÜDERWALDT, Zool. Jahrb., XXVII, 1909, 357 (Campo Itatiaya; habits).—SHARPE, Hand-List Birds, V, 1909, 231, part (in list of species; range).—BRABOURNE and CHUBB, Birds, S. Am., I, 1912, 373, part (ref. orig. descr.; range).—MIRANDA RIBEIRO, Arch. Mus. Nac. Rio de Janeiro, XXIV, 1923, 255 (Retiro do Ramos, Itatiaya, Brazil).—VELHO, Arch. Mus. Nac. Rio de Janeiro, XXIV, 1923, 263 (Monte Serrat, Itatiaya, Brazil).

Chrysomitris magellanica icterica LYNCH-ARRIBALZAGA, An. Mus. Nac. Buenos Aires, (3), I, 1902, 166, part (range).

Spinus ictericus campestris HELLMAVR, Abhand. K. Bayerischen Akad. Wiss., II Kl., XXII, 1906, 680, 718 (crit. on Spix's type).

Spinus ictericus ictericus HELLMAYR, Abhand. K. Bayerischen Akad. Wiss., II Kl., XXII, 1906, 681 (Ypanema, Taquara, and Rio Janeiro, Brazil; meas.; crit.), 718, in text (Estado do Minas Geraes, Brazil; crit.).—HELLMAYR, Nov. Zool., XV, 1908, 33, in text (Rio de Janeiro, São Paulo, and Rio Grande do Sul, Brazil; crit.).

Subspecific characters. Similar to S. magellanicus alleni, but general coloration obviously deeper and richer, with less whitish color on the posterior under surface.

Measurements. Male: wing, 67–71 (average, 69.5); tail, 41–45 (43.5); bill, 10–11.5 (10.5); tarsus, 13–14.5 (13.7). Female (four specimens): wing, 65–68 (67); tail, 39–43 (41); bill, 10–10.5 (10.2); tarsus, 13–14.5 (14).

Range. Forest region of southern Brazil, from southern Bahia to Rio Grande do Sul, and west to eastern Paraguay and Misiones, Argentina.

The available material is scanty and unsatisfactory, Remarks. but, such as it is, indicates that the Spinus of the region extending from extreme southern Brazil to the State of Minas Geraes belongs to a form which is distinct from both magellanicus and alleni, and is characterized mainly by its deep, rich coloration. The yellow of the under parts in the male approaches a saffron or primuline-yellow, while that of the back is browner in tone. This is very characteristic, at least of the series from Minas Geraes, but some of the specimens from other parts are more greenish, and may be in imperfect plumage. Fresh specimens are badly needed, but even on the basis of present material I think we can recognize the present race, for which ictericus of Lichtenstein is the oldest name, calling it a subspecies of magellanicus. The size is about the same as in alleni; the tibiæ and lower abdomen, however, usually have less white than in that form, generally being uniform with the rest of the under surface.

A female from Sapucay, Paraguay (although having some grayish white on the posterior under parts), a male from an unknown locality in the same country, and a male from Santa Ana, Province of Misiones, Argentina, agree better with Brazilian skins than with those from the Argentine and Bolivian Chaco. This would indicate that the range of *ictericus* extends to the west in this region to meet that of *alleni* on the Paraguay River. Records from these parts are accordingly referred to the present form, but a series of specimens are

urgently required. Probably *alleni* occupies the low country in the immediate valley of the Rio Paraguay, while *ictericus* replaces it after passing into the higher country to the eastward.

The reasons for provisionally including *Fringilla campestris* Spix under the synonymy of *ictericus* have already been given. If Spix's plate is at all accurate, it would be another reason, since the color shown is precisely that of the "general run" of the specimens of this form.

The North American references appearing under this head call for some remark. They are all based on a single occurrence, thus recorded by Audubon:

"While residing at Henderson, on the Ohio, I, one cold morning in December, observed five males of this species on the heads of some sunflowers in my garden, and, after watching them for a little time, shot two of them. The rest rose high in the air, and were soon out of sight. Considering the birds nearly allied to our Common American Goldfinch, I was surprised to find the head black at that season. Their notes resembled that of the Pine Finch, *Fringilla Pinus*, but in their manner of feeding, as well as in their flight, they precisely resembled the American Goldfinch, *Fringilla tristis*. All my subsequent endeavours to meet with this species failed, and I am unacquainted with the female."

Audubon's description and figure, as well as the later one by Baird, leave no doubt that his identification of this bird as magellanicus was correct, so far as it went. Baird even went to some pains to point out the differences between magellanicus and the Mexican species, notatus. In spite of this positive identification, we find Baird, Brewer, and Ridgway in 1874 asserting that "three species of Chrysomitris, given by Mr. Audubon, are to be erased from the list: C. stanleyi, C. yarrelli, and C. magellanica. If, as he states, he killed specimens of the latter in Kentucky, they must have belonged to the C. notata of Dubus, a Mexican species, not since met with in our limits." On the strength of this off-hand "identification," made without a re-examination of Audubon's specimen, and solely on the law of probabilities, authors ever since have been including Spinus notatus as a member of the North American fauna, and it has thus appeared in the three editions of the American Ornithologists' Union Check-List. No attention has ever been paid to Sharpe's protest (Catalogue of the Birds in the British Museum, XII, 1888, 217, note)

against this inclusion. Unfortunately the Audubon specimen which Baird handled seems to have disappeared from the collection of the U. S. National Museum, but the description and figure put its identification beyond reasonable doubt, and indicate that it is referable to the Brazilian race of *S. magellanicus* now under discussion.

There remains the question of how five individuals of this species could have wandered in company so far as Kentucky in winter time. It is unthinkable that they could have found their way thus far through natural causes, however extraordinary, or in any way except through human agency. We know that then as now the Brazilian Goldfinch was a favorite cage-bird, and was undoubtedly brought in as such to North American ports. The five birds that Audubon saw must have escaped from captivity, and, following the social and wandering instincts of the species, must have eventually drifted to the inland locality where they were discovered. It seems to me that in view of what we now know *Spinus "notatus*" had best be dropped from the list as a North American bird, but even if considered worthy of inclusion on the "Hypothetical List" it will have to appear as *S. magellanicus ictericus*.

Specimens examined. Brazil: "Rio de Janeiro," 1; Rio das Velhas, near Lagoa Santa, Minas Geraes, 4; Monte Serrat, Serra do Itatiaya, 1; Taquara do Mundo Novo, 2; Jundiahy, São Paulo, 1; Santa Maria, Rio Grande do Sul, 1; São Paulo, 2; Porto Alegre, 2; Rio Grande do Sul, 1; unspecified, 6. Paraguay: Sapucay, 1; unspecified, 2. Argentina: Santa Ana, Misiones, 1. Total, 25.

Spinus magellanicus magellanicus (Vieillot).

- "L'Olivarez" MONTBEILLARD, Hist. Nat. Ois., IV, 1778, 232 ("environs de Buenosayres & du détroit de Magellan"; descr.).
- "Siskin, Var. C;" LATHAM, Gen. Syn. Birds, II, 1782, 291 (Buenos Aires and Straits of Magellan; descr., etc., ex Montbeillard).

Spinus spinus, var. 0, GMELIN, Syst. Nat., I, ii, 1789, 914 (ex Montbeillard).

- Fringilla spinus, var. γ , LATHAM, Ind. Orn., I, 1790, 453 ("Habitat in Bonariæ et freti Magellanici sylvis"; diag., etc., ex Montbeillard).
- "Gafarron" AzaRa, Apunt., I, 1802, 483, part, and Voy. Am. Mér., III, 1809, 292, part (Buenos Aires, Argentina; descr.; habits).
- Fringilla magellanica VIEILLOT, Ois. Chanteurs, 1805, pl. 30 and text (southern part of America—"environs du détroit de Magellan"; orig. descr.; ex Montbeillard and Latham).—VIEILLOT, Nouv. Dict. d'Hist. Nat., XII, 1817, 168 (Straits of Magellan; Buenos Aires, Argentina; descr., etc., ex Azara).—VIEILLOT, Enc. Meth., III, 1823, 983 (Straits of Magellan; Buenos Aires, Argentina;

descr., etc., ex Azara).—GRAY, Gen. Birds, II, 1849, 371 (in list of species; excl. syn. part).—GRAY, Hand-List Birds, II, 1870, 82, excl. syn. (in list of species; range, part).

- Chrysomitris magellanica DARWIN, Zool. Voy. Beagle, Birds, III, v, 1841, 97, excl. syn. part (Maldonado, Uruguay; and Rio Negro, Argentina).—HARTLAUB, Ind. Azara, 1847, 9 (references, part).—BURMEISTER, Journ. f. Orn., VIII, 1860, 257 (Argentina).—BURMEISTER, Reise La Plata-Staaten, II, 1861, 489 (Argentina; references).— CABANIS, Journ. f. Orn., XIV, 1866, 161 (Buenos Aires, Argentina; and Montevideo, Uruguay; crit.).—GIEBEL, Thes. Orn., I, 1872, 674, part (references).—DURNFORD, Ibis, 1876, 159 (Ranchos, Argentina).—GIBSON, Ibis, 1880, 30 (Cape San Antonio, Province Buenos Aires, Argentina; habits; descr. nest and eggs).—HESSE, Journ. f. Orn., LV, 1907, 234 (shape of bill).
- Chrysomitris barbata (not Fringilla barbata Molina) SCLATER and SALVIN, Proc. Zool. Soc. London, 1868, 140 (Conchitas, Province Buenos Aires, Argentina).— HUDSON, Proc. Zool. Soc. London, 1870, 549 (Buenos Aires, Argentina; victim of Cowbird).—DURNFORD, Ibis, 1877, 172 (Baradero, Prov. Buenos Aires, Argentina).—DOERING, Exped. al Rio Negro, I, Zool., 1881, 40 (Rio Sauce, Rio Colorado, and Rio Negro, Argentina).—BARROWS, Bull. Nuttall Orn. Club, VIII, 1883, 132 (Buenos Aires and Concepcion del Uruguay, Argentina; habits).
 —SHARPE, Cat. Birds Brit. Mus., XII, 1888, 216, part (Maldonado, "Chile" [=Uruguay]).
- Chrysomitris icterica (not Fringilla icterica Lichtenstein) SHARPE, Cat. Birds Brit. Mus., XII, 1888, 217, part (Buenos Aires, Conchitas, and Campana, Argentina; descr. male; references; crit.).—SCLATER and HUDSON, Argentine Orn., I, 1888, 64, excl. syn. part (Argentina; descr.; references; habits).—KERR, Ibis, 1890, 361 (Estancia Mata Grande, near Nueva de Julio, Province Buenos Aires, Argentina).—HOLLAND, Ibis, 1891, 16, and 1892, 197 (Estancia Espartillar, near Ranchos, Province Buenos Aires, Argentina).—BUTLER, Foreign Finches in Captivi y, 1894, 44, part (Argentina, ex Hudson).—APLIN, Ibis, 1894, 170 (Santa Elena, Uruguay; habits).—DUBOIS, Syn. Avium, I, 1902, 592, part (Argentina, in range).—GRANT, Ibis, 1911, 101 (Los Yngleses and Luiconia, Ajó, Province Buenos Aires, Argentina; descr. nest and eggs).—GIBSON, Ibis, 1918, 388 (Cape San Antonio, Province Buenos Aires; nesting).
- Chrysomitris magellanica icterica LYNCH-ARRIBALZAGA, An. Mus. Nac. Buenos Aires, (3), I, 1902, 166, part (range).
- Spinus idericus SHARPE, Hand-List Birds, V, 1909, 231, part (Argentina, in range).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373, part (Argentina, in range).—OGILVIE-GRANT, Cat. Birds Eggs Brit. Mus., V, 1912, 182 (Argentina; descr. eggs).—SERIE, El Hornero, I, 1917, 36 (Argentina, in captivity); 1918, 73 (Argentina; common name).—TREMOLERAS, El Hornero, II, 1920, 23 (Montevideo, Canelones, Colonia, San José, and Florida, Uruguay).—FERNANDEZ, El Hornero, II, 1920, 35, in text (Monte Veloz, Argentina).—RENARD, El Hornero, II, 1920, 60 (Cañuelas, Province Buenos Aires, Argentina).—DAGUERRE, El Hornero, II, 1922, 271 (Rosas, Argentina).—PEREYRA, El Hornero, III, 1923, 171 (Escobar and Marianas, Province Buenos Aires, Argentina).

Spinus ictericus ictericus DABBENE, An. Mus. Nac. Buenos Aires, (3), XI, 1910,

387, part (Argentine localities, references, and range).— HUSSEY, Auk, XXXIII, 1916, 397 (La Plata, Argentina).—DABBENE, El Hornero, I, 1918, 181, in text (crit.).—MARELLI, Mem. Minist. Obras Publicas, 1922–23, 1924, 658 (Barracas al Sud, Province Buenos Aires, Argentina).

Description. Adult male: above bright warbler-green, almost uniform, the rump lemon-chrome; head (all around) glossy black, followed by a narrow and ill defined yellowish nuchal band; wings black, with a broad basal band of lemon-yellow (wanting on the outer web of the outermost primary), and broad outer terminal margins of yellow (citron-yellow to olive-yellow), inclining to whitish at the tips, on the inner secondaries; primary-coverts black; lesser and middle coverts black, broadly tipped with the color of the back; greater coverts also black, tipped with yellow (lemon-yellow to strontian yellow); upper tail-coverts like the back; tail black, the basal half or more yellow (lemon-yellow to lemon-chrome); throat black, with more or less irregular posterior margin, not sharply defined as a rule from the lemon-chrome of the sides of the neck and the rest of the under surface; tibiæ and lower abdomen usually more or less white; under tail-coverts sometimes showing faint dark streaks; under wing-coverts pale yellow, the greater series with grayish tips; "iris brown; bill and feet blackish."

Adult female similar in general to the male, but decidedly duller throughout (dull warbler-green above, below strontian yellow, the breast and sides shaded with pyrite-yellow), the head uniform with the back, the wings and tail dusky brown, etc. In fresh plumage (May) females are more or less washed with grayish feather-tipping above and below. Some females are very much duller than others, with the under surface extensively whitish; they seem to be in imperfect plumage.

Adult males seem to vary little according to season, although wear serves to make the colors more vivid if anything. Young males are variously intermediate between a plumage like that of the adult female and that of the fully mature male. Females vary much more than do males, as already said. The juvenal plumage of this race has not been seen by me.

Measurements. Male: wing, 70-77 (average, 74); tail, 46-49 (47.5); bill, 10-11 (10.5); tarsus, 14.5-16 (15). Female (eight specimens): wing, 68-72 (70); tail, 44-47 (45); bill, 10-11 (10.3); tarsus, 13-15.5 (14.5).

Range. Province of Buenos Aires, Argentina, and southern Uruguay, south to the Rio Negro.

Remarks. After this species had been successively noted by Montbeillard, Latham, and Azara (1778–1802), it was finally given a binomial name by Vieillot in 1805, and duly figured. Montbeillard, who was associated with Buffon in preparing the "Histoire Naturelle des Oiseaux," gave Buenos Aires and the Straits of Magellan as the

61

habitat of his "L'Olivarez." Latham merely copied Montbeillard's account. Azara's names are supposed to refer mainly to the species found in Paraguay, but in describing his "Gafarron" the only locality mentioned is Buenos Aires. Vieillot, although he quoted both "Buffon" (i. e., Montbeillard) and Latham, mentioned only the Straits of Magellan, possibly by inadvertence, and named the species magellanicus. But we now know that the only species of Spinus occurring at the Straits of Magellan is S. barbatus. Sharpe has therefore proposed to drop the name megallanicus altogether as conveying a wrong impression, and furthermore because he is "convinced that the bird figured by Vieillot in his 'Oiseaux Chanteurs' is the longbilled Guiana form." In this action he has been followed by almost all other authors, but I am satisfied that Cabanis was quite right when in 1866 he claimed that the name magellanicus would have to be reserved for the Argentine race, if distinguishable, and for the species at large in any event. Vieillot's description and references are pertinent to the form under consideration, and the fact that he gave an erroneous locality and based his name upon it has no bearing on the case under our present rules. As for Sharpe's claim that Vieillot's figure represents the long-billed Guiana form, it is only necessary to remark that the figure is no more inaccurate than many others in the same work, and to point out that at this early date the highlands of Guiana were not supplying any ornithological novelties. There remains no valid reason, therefore, for refusing to accept the name magellanicus for this, the earliest known form of the group, after designating Buenos Aires as the proper type-locality.

The range of the present form appears to be comparatively restricted, all the records falling within the Province of Buenos Aires and the southern part of Uruguay, with one outlying record from the Province of Entre Rios. Some doubt attaches to Darwin's record for the Rio Negro, which may refer to *S. barbatus*, since this latter is known from the Rio Colorado, a little farther north, on the strength of a specimen misidentified by Mr. Peters. A specimen from Maldonado, "Chile" (= Uruguay), in the collection of the British Museum is listed under *S. barbatus*, almost certainly by inadvertence, if the locality is correct. There is nothing to show that *S. magellanicus magellanicus* approximates the range of *tucumanus* at any point; in fact, there appears to be a wide gap separating the two forms.

Considerable has been written on the habits of the present form by

various authors. Except when breeding, it goes around in wandering flocks, and is very fond of the seeds of certain *Compositæ*. There seems to be some migratory movement, as it is much commoner at some times than at others. It is a fine singer, and is often kept in cages on this account. The nest is a neat, cup-shaped structure, placed in the fork of a tree or bush, and the eggs are very pale blue, and vary from three to five in number.

Specimens examined. Argentina: Buenos Aires, 8; Chacabuco, 3; Tandil, 2; Ajó, 2; La Plata, 2; Conchitas, 6; Mar del Plata, 3; Concepcion del Uruguay, 1; Sauce Chico, 2; General Lavalle, 1; Estancia "Los Yngleses," 10 miles S. W. General Lavalle, 7; Dolores, 2; San Vicente, 1. Uruguay: San Vicente, Roche, 2. Total, 41.

Spinus magellanicus tucumanus, subsp. nov.

- Chrysomitris magellanicus (not Fringilla magellanica Vieillot) FRASER, Proc. Zool. Soc. London, 1843, 113 ("Valleys of the Andes," Chile[?]).—DESMURS, in Gay, Hist. Chile, Zool., I, 1847, 352 (Chile[?]; descr.).
- Chrysomitris magellanica BURMEISTER, JOURN. f. Orn., VI, 1858, 160, in text (Mendoza, Argentina).—SALVIN, Ibis, 1880, 355 (Salta, Argentina).
- Chrysomitris barbata (not Fringilla barbata Molina) WHITE, Proc. Zool. Soc. London, 1882, 600, part (Sierra de Totoral, Catamarea, Argentina).
- Chrysomitris icterica (not Fringilla icterica Lichtenstein) SHARPE, Cat. Birds Brit. Mus., XII, 1888, 217, part (Salta and Cosquin, Argentina; descr. female).— FRENZEL, Journ. f. Orn., XXXIX, 1891, 120 (Province of Córdoba, Argentina).
 —SALVADORI, Boll. Mus. Zool. ed Anat. comp. Torino, X, No. 208, 1895, 7, part (San Pablo, Tucumán, and Chilchas, Salta, Argentina); XII, No. 292, 1897, 10 (Campo Santo, Salta, Argentina).—ALBERT, Contr. Est. Aves Chilenas, xi, 1901, 460 (Chile[?]; descr.; meas.; habits).—BRUCH, Rev. Mus. La Plata, XI, 1904, 255 (Rosario de Lerma, Salta, Argentina).—BAER, Ornis, XII, 1904, 216 (Santa Ana, Tucumán, Argentina).—LILLO, Rev. Letras y Ciencias Sociales, 1905, p. 10 of reprint (Estado Tucumán, Argentina).
- Carduelis icterica icterica HARTERT and VENTURI, Nov. Zool., XVI, 1909, 176 (Barracas al Sud and Mocovi, Tucumán, Argentina; descr. eggs).
- Spinus ictericus ictericus DABBENE, An. Mus. Nac. Buenos Aires, (3), XI, 1910, 387, part (Argentine localities, references, and range).
- Spinus ictericus SANZIN, El Hornero, I, 1918, 152 (Mendoza, Argentina).—GIA-COMELLI, El Hornero, III, 1923, 69 (Province La Rioja, Argentina).

Type, No. 142,201, Collection American Museum of Natural History, adult male; Lavalle (1800 ft.), Santiago del Estero, Argentina, June 17, 1916; Leo E. Miller and H. S. Boyle.

Subspecific characters. Similar to S. magellanicus magellanicus, but general coloration darker and duller, and black of throat in the

male averaging more restricted, and more sharply defined from the yellow of the breast.

Measurements. Male: wing, 70-76 (average, 72); tail, 44-49 (46.5); bill, 9.5-10.5 (10); tarsus, 13.5-14.5 (14). Female (six specimens): wing, 66-71 (69); tail, 43-46 (44); bill, 9.5-10.5 (10); tarsus, 13.5-14.5 (14).

Range. Mountainous region of northern and western Argentina. Remarks. This new form has heretofore been confused with true magellanicus, but is readily distinguishable by its darker, duller coloration throughout. Above the male is dull warbler-green; the yellow of the rump is duller and more restricted; the yellow of the under parts and sides of the neck is perceptibly duller, and the black of the throat is more restricted, and usually is more sharply defined posteriorly. The yellow at the base of the middle pair of rectrices averages more restricted, and sometimes is entirely absent. The pale outer edgings of the secondaries are duller greenish, and the tips are more tinged with gray. Females, too, average duller than females of the typical race. These differences are not seasonal, judging by the dates of the specimens. In juvenal dress (three specimens, March 19 and 21) the bird is dull citrine and buffy yellow below, with the wingand tail-pattern as in the adults, but all the colors duller.

This is the form of magellanicus which occupies most of northern and western Argentina, but where it meets the range of the typical form, if at all, does not appear, there being a considerable stretch of country from which there are no records. Nor are there any circumstantial records from Chile, and the chances are that the form does not pass the crest of the Andes, nor go much south of the latitude of Mendoza. (The record from Lago General Paz by Sr. Lynch-Arribalzaga proves to belong to *S. barbatus*). It runs up to at least 9000 feet on the western slope of the Andes. Two examples from the Province of Buenos Aires, April 5 and 16, indicate that it may migrate towards the coast for the winter, at least sometimes. To the northward it doubtless grades into *bolivianus*, specimens in worn plumage from Rosario de Lerma, Salta, and Tilcara, Jujuy, showing much brown on the back, as in that form.

Specimens examined. Argentina: Tilcara, (8000 ft.), Jujuy, 3; Salta, 2; Rosario de Lerma, Salta, 2; Tafi Viejo, Tucumán, 2; Sierra de Aconquija (3000 m.), Tucumán, 1; Concepcion, Tucumán, 8; Santa Ana, Tucumán, 1; Tucumán, 1; Tafi del Valle (7000 ft.), Tucumán, 1; above San Pablo (4000 ft.), Tucumán, 1; Sarmiento

(1700 ft.), Tucumán, I; Tapia (2300 ft.), Tucumán, 2; Lavalle (1800 ft.), Santiago del Estero, 4; Angaco Sud, San Juan, 2; Valle de los Reartes, Sierra de Cordoba, I; Mendoza, 2; El Salto (6000 ft.), Potrerillos, Mendoza, 4; Potrerillos (5000 ft.), Mendoza, 5; Quilmes, Buenos Aires, I; Province Buenos Aires, I. Total, 45.

Spinus magellanicus bolivianus (Sharpe).

Chrysomitris barbata (not Fringilla barbata Molina) SCLATER, Cat. Am. Birds, 1861, 125, part, excl. syn. (Bolivia).

- [Chrysomitris icterica] Subsp. β Chrysomitris boliviana SHARPE, Cat. Birds Brit. Mus., XII, 1888, 220, excl. syn. part (Bolivia; orig. descr.; type [not designated] in coll. Brit. Mus.).
- Chrysomitris icterica var. boliviana DUBOIS, Syn. Avium, I, 1901, 592 (references; range).
- Chrysomitris magellanica boliviana LYNCH-ARRIBALZAGA, An. Mus. Nac. Buenos Aires, (3), I, 1902, 166 (range).

Spinus bolivianus SHARPE, Hand-List Birds, V, 1909, 232 (in list of species; range). —BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).

Subspecific characters. Similar to Spinus magellanicus tucumanus, but adult males with the feathers of the upper parts more or less prominently centered with dusky or blackish; this is particularly the case with the upper wing- and tail-coverts, which are conspicuously blacker, and less "solid" warbler-green than in the other form; adult females averaging more brightly colored below.

Measurements. Adult male: wing, 73–77 (average, 75); tail, 45–51 (48.5); bill, 9.5–10.5 (10); tarsus, 14.5–15 (14.5). Female: wing, 71–75 (72); tail, 44–48 (46.5); bill, 10–10.5 (10); tarsus, 14–15 (14.5).

Range. Highlands of Bolivia, from Cochabamba south at least to the Potosi region.

Remarks. The characters assigned to this form by its describer do not hold good at all, as already pointed out by Dr. Chapman (Bulletin U. S. National Museum, No. 117, 1921, 110), but the name must be used for the large Bolivian race, in which the characters of tucumanus are carried a step further. Individual variation in both sexes is excessive. Males vary in the amount of dark marking above, some individuals being almost as uniform above as tucumanus, at least in fresh plumage, while others are conspicuously streaked or mottled. Wear naturally tends to bring out this streaking. The extent of black on the throat is also a variable quantity: in one example (No. 139,659, Collection American Museum of Natural History) the whole throat and upper breast are black, while in another individual

65

(No. 139,652) the yellow invades the black area in asymmetrical pattern almost to the chin.

The brightest females are decidedly greenish (near yellowish olive) above and yellowish below (pale lemon-yellow, the throat and breast shaded with olive-yellow). From examples fitting this description there is a perfect gradation all the way to individuals which are deep grayish olive above, tinged with olive, and ashy whitish below, washed irregularly with olive. These latter are in imperfect plumage. In juvenal dress both sexes resemble the adult female, but are still duller, and washed with buffy yellow, the lower parts being of this color (amber-yellow to straw-yellow) almost wholly; the wing-coverts and inner secondaries are tipped with broad buffy ends. In worn plumage both sexes lose the marginal tipping on the inner secondaries.

Specimens examined. Bolivia: Cochabamba, 2; Duraznillo, 1; Vacas, 2; Arque, 1; Parotani (8800 ft.), 6; Chaco, Yungas, 1; Vinto (8600 ft.), Cochabamba, 7; Cuchacancha (11,000 ft.), Cochabamba, 1; Rio Cachimayo (8700 ft.), Sucre, 6; Pulque (9400 ft.), Sucre, 5; Rio Pilcomayo (8000 ft.), Sucre, 3; California (6600 ft.), 1. Total, 36.

Spinus magellanicus urubambensis, subsp. nov.

Spinus ictericus peruanus (not of von Berlepsch and Stolzmann) CHAPMAN, Bull. U. S. Nat. Mus., No. 117, 1921, 110, part (Chospiyoc, Ttica-Ttica, Cuzco, Pisac, and La Raya, Peru; crit.).

Type, No. 129,181, Collection American Museum of Natural History, adult male; Cuzco (11,000 ft.), Peru, October 16, 1914; H. and C. Watkins.

Subspecific characters. Male similar to the same sex of Spinus magellanicus bolivianus, but averaging brighter, more yellowish green above. Adult female apparently not so brightly colored below (normally?).

Measurements. Male: wing, 73-79 (average, 74.5); tail, 46-52 (48.5); bill, 10-11.5 (10.5); tarsus, 15-16 (15.5). Female (three specimens): wing, 70-76 (74); tail, 45-48 (47); bill, 10-10.5 (10.2); tarsus, 15-15.5 (15.2).

Range. Andes of south-central Peru, in the Urubamba Valley, northward to the Rio Mantaro, and southward to northern Chile (Tacna).

Remarks. Birds of the *S. magellanicus* type from the upper part of the Urubamba Valley differ from those hailing from the coast region of Peru in their larger size and duller coloration, the females in particular being much duller colored, more greenish below, less

yellowish. Since the two forms occur together at one point at least (Pisac), they must represent two specific types. Five birds from Oroya, on the Rio Mantaro, northeast of Lima, mentioned by Dr. Chapman, I would refer to the present form, their smaller size being attributable to their more worn condition. This record extends the range of urubambensis considerably, and goes to show that it covers some of the same area as *peruanus*. The new race is close to *bolivianus*, but more brightly colored in the male, when birds in the same condition of plumage are compared. With only five females one cannot of course be too sure, but all are duller, less yellowish below than females of bolivianus in perfect plumage, although not so different from those in imperfect plumage, which they of course may be. There are eight birds in the von Berlepsch collection from the vicinity of Cuzco, collected by Gustav Garlepp, all in juvenal dress; they are rich buffy beneath and buffy brownish above, the males with a trace of the black throat. They were shot in June and July. No. 145,594, Collection American Museum of Natural History, July 2, is also in this dress, with a restricted black throat-patch. So far as I know this is the only neotropical Spinus showing this character at this early stage.

Specimens examined. Peru: Cuzco (11,000 ft.), 3; Ttica-Ttica (11,500 ft.), Cuzco, 3; Lauramarca (4000 m.), Cuzco, 5; Lucre (3500 m.), Cuzco, 4; Anta (3500 m.), Cuzco, 3; Sicuani, 1; Chospiyoc, 1; Ollantaytambo, 1; La Raya, 2; Pisac, 3; Oroya, 5; unspecified, 1. Chile: Palca, Tacna (3000 m.), 1. Total, 33.

Spinus notatus notatus (DuBus).

Carduelis notata DUBUS, Bull. Acad. Roy. Belgique, XIV, ii, 1847, 106 (Mexico; orig. descr.; type in coll. Brussels Mus.).—DUBUS, Esquiss. Orn., 1848, pl. 37 (Mexico).—LAFRESNAYE, Rev. Zool., 1848, 247 (reprint orig. descr.).

Fringilla notata GRAY, Gen. Birds, II, 1849, 371 (in list of species; ref. orig. descr.). —GRAY, Hand-List Birds, II, 1870, 82 (in list of species; range).

Chrysomitris notata BONAPARTE, Consp. Avium, I, 1850, 516 (diag.; ref. orig. descr.).—CABANIS, Mus. Heineanum, I, 1851, 160, excl. syn. part (Mexico; references).—LICHTENSTEIN, Nom. Avium Mus. Zool. Berolinensis, 1854, 46 (Mexico).—SCLATER, Proc. Zool. Soc. London, 1856, 304 (Orizaba, Mexico); 1858, 303 (La Parada, Oaxaca, Mexico); 1859, 365 (Jalapa, Vera Cruz, Mexico), 380 (Totontepec, Oaxaca, Mexico).—SCLATER and SALVIN, Ibis, 1860, 275 (Volcan de Fuego, Coban, and San Juan Sacatipequez to Antigua, Guatemala).—SCLATER, Cat. Am. Birds, 1861, 124 (Orizaba, Vera Cruz, Mexico; references).—SCLATER, Proc. Zool. Soc. London, 1864, 174 (City of Mexico, Mexico).

67

CASSIN, Proc. Acad. Nat. Sci. Philadelphia, 1865, 92 (Mirador and Orizaba, Mexico; Guatemala; crit.).—CABANIS, Journ. f. Orn., XIV, 1866, 162, in text (crit.)—SUMICHRAST, Mem. Boston Soc. Nat. Hist., I, 1869, 550, 561 (Temperate Region, Vera Cruz, Mexico).—GIEBEL, Thes. Orn., I, 1872, 674, excl. syn. part (references).—SCLATER and SALVIN, Nom. Avium Neotrop., 1873, 34 (Mexico and Guatemala, in range).—LAWRENCE, Bull. U. S. Nat. Mus., No. 4, 1876, 22 (Gineta Mountains, Chiapas, Mexico).—SALVIN, Cat. Strickland Coll., 1882, 214 (Guatemala; references).—HEINE and REICHENOW, Nom. Mus. Heineani Orn., 1882, 93 (Mexico).—SALVIN and GODMAN, Biol. Centr.-Am., Aves, I, 1886, 428 (Mexican and Guatemalan localities and references; descr.).—FERRARI-PEREZ, Proc. U. S. Nat. Mus., IX, 1886, 149 (Teziutlan, Puebla, Mexico).—SHARPE, Cat. Birds Brit. Mus., XII, 1888, 221 (Mexican and Guatemalan localities and references; descr.).—(?)NEHRKORN, Kat. Eiersammlung, 1899, 107 (Mexico; descr. eggs).—DUBOIS, Syn. Avium, I, 1901, 593 (references; range).

Chrysomitris melanoxantha LICHTENSTEIN, Nom. Avium Mus. Zool. Berolinensis, 1854, 46 (Mexico; nomen nudum).

Chrysomitris notatus BAIRD, Rept. Pacific R. R. Surveys, IX, 1858, 418 (diag.), 419 (meas.), 420, in text (crit.).

Spinus notatus RIDGWAY, Man. N. Am. Birds, 1887, 400, part (descr.; range).—
RIDGWAY, Proc. U. S. Nat. Mus., XIV, 1891, 470 (Santa Ana, Honduras).—
CHAPMAN, Bull. Am. Mus. Nat. Hist., X, 1898, 30 (Jalapa, Vera Cruz, Mexico).
—SHARPE, Hand-List Birds, V, 1909, 232 (in list of species; range).—OGILVIEGRANT, Cat. Birds Eggs Brit. Mus. V, 1912, 182 (descr. eggs).

Spinus notatus notatus RIDGWAY, Bull. U. S. Nat. Mus., No. 50, I, 1901, 102 (Mexican and Central American localities and references; descr.; crit.).

Description. Adult male: above bright warbler-green with a golden sheen, more or less mottled with black centers to the feathers, brightening on the rump into wax-yellow or sulphine-yellow; upper tail-coverts and tail black, the basal half of the rectrices (except the middle pair) lemon-yellow; wings black, with a broad basal band of lemon-chrome, wanting on the outer web of the outermost primary and on the innermost tertiaries; upper wing-coverts black, the greater series tipped with sulphine-yellow; head all around; throat, and upper breast black; sides of neck empire-yellow; rest of under parts deep lemon-chrome, paler posteriorly, the flanks shaded with pyrite-yellow; under wing-coverts and inner margins of remiges below amber-yellow; "iris brown; upper mandible blackish-brown, lower dull ashy; feet brownish" (Sumichrast).

Female similar to the male, but duller in color, the upper parts more greenish, the under parts paler yellow (nearest strontian yellow), and the yellow wing-patch smaller and paler.

Juvenal plumage: above, including pileum, dull citrine or buffy olive with a greenish wash, slightly brighter on the rump; wings dusky brown with paler edgings and tips to the secondaries, the yellow basal band paler and more restricted, the wing-coverts tipped with olive-lake; tail dusky brown with yellow base and narrow greenish yellow margins to the feathers; sides of head and under parts dull wax-yellow to olive-ocher. A series from Santa Ana, Honduras, December 23, shows the transition from this stage into the next, the moult including the wings and tail.

Measurements. Male: wing, 64–68 (average, 66.5); tail, 40–44 (42); bill, 11.5–12 (11.9); tarsus, 13–14 (13.5). Female (three specimens): wing, 64–69 (66); tail, 40–45 (42); bill, 11.5–12.5 (12); tarsus, 13–13.5 (13.2).

Range. Highlands of southern Mexico, from Michoacan to Vera Cruz, and southward through Guatemala and western Honduras to north-central Nicaragua.

Remarks. This species was described by DuBus from a specimen in the Brussels Museum without any more definite locality than "Mexico," and I therefore would designate Jalapa, in the State of Vera Cruz, as the type-locality. It has been traced west to Mount Tancitaro, Michoacan, by Messrs. Nelson and Goldman, and is common in the highlands of Guatemala. The Nicaragua record is of a young bird taken by Mr. W. B. Richardson at Matagalpa, clearly belonging to this form. Spinus notatus differs decidedly from all the other neotropical species of this genus in certain important respects. Its bill is slenderer and more pointed even than that of S. longirostris, the culmen being nearly straight; the wings (except for the yellow basal band) are plain black, with very little or no trace of paler edgings on the tertiaries or on the lesser and middle coverts, and only the greater coverts are slightly thus tipped; and most significant of all, the sexes are similar, the female being duller than the male, but with the same color-pattern. The black of the throat is extended over the upper breast, but does not invade the sides of the breast. These characters suggest that Spinus notatus is a form lying at the end of an evolutionary chain in time, just as it is in a geographical sense. It was probably derived independently from the same original stock as the forms of the South American black-hooded group, but is now completely isolated from all of them. It does not yet appear whether its range approximates that of S. xanthogaster.

Specimens examined. Mexico: Jalapa, Vera Cruz, 7; Texola, Vera Cruz, 1; Orizaba, Vera Cruz, 4; Mirador, Vera Cruz, 2; Jico, Vera Cruz, 1; La Cumbre, Mascota, Vera Cruz, 1; Gineta Mountains, Chiapas, 1; Mountains near Santo Domingo, Oaxaca, 1; Huanchinango, Puebla, 1; Mount Tancitaro, Michoacan, 2; unspecified, 3. Guatemala: Villa Nueva, 1; unspecified, 10. Honduras: Santa Ana, 6. Nicaragua: Matagalpa, I. Unspecified, 3. Total, 45.

Spinus notatus forreri (Salvin and Godman).

Chrysomitris forreri SALVIN and GODMAN, Biol. Centr.-Am., Aves, I, 1886, 429 (Ciudad Durango, Mexico; orig. descr.; type now in coll. Brit. Mus.).—SHARPE, Cat. Birds Brit. Mus., XI, 1888, 222 (Ciudad Durango, Mexico; descr.).— DUBOIS, Syn. Avium, I, 1901, 593 (ref. orig. descr.; range).

Spinus forreri RIDGWAY, Man. N. Am. Birds, 1887, 400 (descr.; range).—SHARPE, Hand-List Birds, V, 1901, 232 (in list of species; range).

Spinus notatus forreri RIDGWAY, Bull. U. S. Nat. Mus., No. 50, I, 1901, 103 (Mexican localities and references; descr.; crit.).

Subspecific characters. Similar to Spinus notatus notatus, but general coloration of upper parts more greenish, and under parts duller, less golden yellow.

Measurements. Male: wing, 66–70 (average, 68.5); tail, 41–45 (44); bill, 11.5–12.5 (12); tarsus, 13–13.5 (13.2). Female: wing, 63–67 (65.5); tail, 40–44 (42); bill, 11–12 (11.5); tarsus, 13–13.5 (13.2).

Range. Highlands of western Mexico, from central Chihuahua south to southern Jalisco.

Remarks. With a much larger series than were available to Mr. Ridgway the differences ascribed to this race by him are obvious. It differs from true *notatus* in its more greenish, less golden coloration above, and duller coloration of the under parts. As Mr. Ridgway remarks, the male of *forreri* resembles closely the female of *notatus*, being dull lemon-chrome below, washed with pyrite-yellow on the flanks in the brightest specimens, and with wax-yellow in the dullest. Females vary from strontian yellow to citron-yellow below, brightest anteriorly; above they are rather bright yellowish olive. In the extent of black on the under parts the two races are about the same.

The records from Chihuahua extend the range of *forreri* considerably farther north than heretofore known, and bring it within a comparatively short distance of the United States border.

Specimens examined. Mexico: Bravo, Chihuahua, 26; Mina Abundancia, Chihuahua, 7; Chihuahua, Chihuahua, 1; (State of) Chihuahua, 1; El Salto, Durango, 7; Chacala, Durango, 1; Santa Teresa, Tepic, 1; San Sebastian, Jalisco, 3; Volcan de Fuego, Jalisco, 4; Tonila, Jalisco, 1; Las Masos (5800 ft.), Jalisco, 1; La Laja, Jalisco, 1; Las Canoas, 7000 ft., near Volcano Colima, Jalisco, 4; Volcano Colima, Jalisco, 1; La Pisagua, near Volcano Colima, Jalisco, 5. Total, 64.

Annals of the Carnegie Museum.

Spinus xanthogaster xanthogaster (DuBus).

- Chrysomitris xanthogastra DUBUS, Bull. Acad. Roy. Belgique, XXII, 1855, i, 152 (Ocaña, Colombia; orig. descr.; type in coll. Brussels Mus.).—DUBUS, Compt. Rend., XL, 1855, 356 (ref. orig. descr.; crit.).— SCLATER and SALVIN, Proc. Zool. Soc. London, 1870, 781, 785, part (Merida, Venezuela; "Bogotá," Colombia; Costa Rica; crit.).—WYATT, Ibis, 1871, 328 (Canuto and Cocuta Valley, 5000– 6000 ft., Colombia).—SCLATER and SALVIN, Nom. Avium Neotrop., 1873, 34, part (range).—SCLATER and SALVIN, Proc. Zool. Soc. London, 1879, 508 (Santa Elena, Antioquia, Colombia; descr. eggs).—ZELEDON, Cat. Aves Costa Rica, 1882, 9 (Costa Rica).—SALVIN, Cat. Strickland Coll., 1882, 214 (references). von BERLEPSCH, Journ. f. Orn., XXXII, 1884, 275 (Ocaña, Colombia, ex DuBus), 318 (Canuto and Cocuta [Valley], Colombia, ex Wyatt).—DUBOIS, Syn. Avium, I, 1901, 592 (references; range).
- Chrysomitris bryantii CASSIN, Proc. Acad. Nat. Sci. Philadelphia, 1865, 91 (Dota, Costa Rica; orig. descr.; type in coll. U. S. National Museum).—STIMPSON, Trans. Chicago Acad. Sci., I, 1868, 128, pl. 17 (descr., ex Cassin).—LAWRENCE, Ann. Lyc. Nat. Hist. N. Y., IX, 1868, 104 (Dota, Costa Rica).—von FRANTZIUS, Journ. f. Orn., XVII, 1869, 302 (Costa Rica).—Boucard, Proc. Zool. Soc. London, 1878, 56 (Volcano Irazú, Costa Rica).

Chrysomitris bryanti GIEBEL, Thes. Orn., I, 1872, 673 (references).

Fringilla bryanti GRAY, Hand-List Birds, II, 1870, 81 (in list of species; range).

- Chrysomitris xanthogaster SALVIN and GODMAN, Biol. Centr.-Am., Aves, I, 1886, 430, part, pl. 31, fig. 3 (Costa Rican and S. Am. localities and references; descr.; range; crit.).—SHARPE, Cat. Birds Brit. Mus., XII, 1888, 209 (Costa Rican and S. Am. references and localities; descr.).—NEHRKORN, Kat. Eiersammlung, 1899, 107 (Colombia; descr. eggs).
- Spinus xanthogastra ZELEDON, An. Mus. Nac. Costa Rica, I, 1887, 112 (Cartago, Sarchi, and Dota, Costa Rica).
- Spinus xanthogaster RIDGWAY, Bull. U. S. Nat. Mus., No. 50, I, 1901, 105 (descr.; range; references).—BANGS, Proc. New England Zool. Club, IV, 1908, 34 ("Bogotá," Colombia; crit.).—SHARPE, Hand-List Birds, V, 1909, 230 (in list of species; range).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 372 (ref. orig. descr.; range).—OGILVIE-GRANT, Cat-Birds Eggs Brit. Mus., V, 1912, 179 (Santa Elena, Antioquia, Colombia; descr. eggs).—CHAPMAN, Bull. Am. Mus. Nat. Hist., XXXVI, 1917, 564 (San Antonio and Santa Elena, Colombia).
- Spinus xanthogaster bryanti BANGS, Proc. New England Zool. Club, IV, 1908, 34 (Costa Rica; crit.).—CARRIKER, Ann. Carnegie Mus., VI, 1910, 914 (Costa Rican localities and references; range; crit.).

Description. Adult male: glossy black, except the under parts from the breast down, and the bases of the remiges, which are rich yellow (lemon-chrome), also the concealed bases of the rectrices (usually excepting the middle pair), which are lemon-yellow; sides and flanks more or less mottled with black, and lower abdomen whitish medially; under wing-coverts and inner margins of remiges pale yellow; outer web of outermost primary entirely black; "iris brown; feet brownish horn-color; bill black, paler at base below."

Female: above dark warbler-green, mottled with dusky centers to the feathers; wings dusky black, the coverts edged and tipped with warbler-green, like the back, the remiges with a basal band of lemonyellow, omitted on the outer webs of the two outer primaries; under parts bright warbler-green, becoming brighter and more yellowish (strontian yellow) posteriorly and medially; under tail-coverts and concealed bases of rectrices lemon-yellow; under wing-coverts dull yellow; soft parts colored as in the male.

There is a series connecting the bright-colored females, above described, with those in imperfect plumage, the extreme of which (illustrated by No. 210,146, Collection U. S. National Museum) is duller green (olive-green) above, and very much paler and duller below, dull grayish in fact, the breast and sides shaded with greenish, the abdomen medially and crissum grayish white.

In juvenal dress (No. 25,309, Collection Carnegie Museum) the bird resembles the adult female, but is still duller, with a buffy tinge above and below, the under parts being almost uniform dull yellow (between deep colonial-buff and olive-ocher); the yellow wing-patch is present as in the adult, but the secondaries are conspicuously margined and tipped with grayish, shaded with green. Several specimens from the Eastern Andes of Colombia show the transition by moult from this plumage into that of the adult bird (August 30– September 9).

Measurements. Male: wing, 64–67 (average, 65.5); tail, 37–42 (39); bill, 9–10 (9.5); tarsus, 13–14 (13.3). Female: wing, 63–66 (64); tail, 37–40 (38.5); bill, 9–10 (9.5); tarsus, 13–14 (13.5).

Range. Subtropical Zone, mountains of Costa Rica and western Panama, and Andes of Venezuela, Colombia, and Ecuador.

Remarks. In describing his *Chrysomitris bryantii* in 1865 Cassin was evidently unaware of an earlier and pertinent name for the species, bestowed by DuBus ten years before. Sclater and Salvin, in calling attention to the matter in 1870, claimed that examples from Costa Rica and Colombia, the respective type-localities of the two names, were identical. Mr. Bangs, writing in 1908, considered that the Costa Rican bird was separable as a geographical race, and I was at one time inclined to favor this view. But after comparing all the material now available I have reached the conclusion that the recognition of the Costa Rican bird under the name *bryantii* is inadvisable. There is a slight average difference in color, but it is very inconstant, while all the other alleged characters to which Mr. Bangs calls attention fail in the light of the larger series. As in several other allied forms, the size of the yellow spot on the wings varies greatly.

All the adult females examined are from Costa Rica and Panama

with the exception of No. 172,409, Collection American Museum of Natural History, which comes from La Chonta, Province del Oro, Ecuador, a locality at the southern limit of the known range of this form. This example may represent a different subspecies; it agrees well with Costa Rican females in general coloration, but has a shorter wing-tip and shorter wing (60 mm.).

In the original description of this species it was compared with *Spinus atratus*, but its real relationship appears to lie with "Astragalinus" psaltria croceus, of which it is probably the Subtropical Zone representative, as already pointed out. It is strictly a form of the Subtropical Zone, and, like many other birds characteristic of that zone, has a discontinuous distribution, the low country in Panama interrupting its range. It is apt to be met with in small flocks, and has a call resembling that of the American Goldfinch. The eggs are described as "pale greenish white, thickly but faintly freckled with lilac and brownish spots."

Specimens examined. Costa Rica: Vulcano Irazú, 9; Ujuras de Terraba, 2; Dota Mountains, 9; Coliblanco, 1; Volcano Turrialba, 1; Copey, 4; Azahar de Cartago, 2; La Estrella de Cartago, 1; Carrillo, 2; Juan Viñas, 1; unspecified, 2. Panama: Boquete, I. Colombia: La Palmita, 2; Pueblo Nuevo, 1; Ocaña, 2; Cachiri, 1; San Antonio (6600 ft.), 5; (Province) Antioquia, 1; Santa Elena (9000 ft.), Antioquia, 2; "Bogotá," 7. Venezuela: Merida, 6; Valle, Merida, 1; Escorial, 1; Culata, 1. Ecuador: La Chonta (2000 ft.), Oro, I. Total, 67.

Spinus xanthogaster stejnegeri (Sharpe).

- Chrysomitris xanthogastra (not of DuBus) SCLATER and SALVIN, Proc. Zool. Soc. London, 1870, 785, part (Bolivia).—SCLATER and SALVIN, Nom. Avium Neotrop., 1873, 34, part (Bolivia).—SCLATER and SALVIN, Proc. Zool. Soc. London, 1879, 607 (Sorata and Nairapi, Yungas, Bolivia).
- Chrysomitris xanthogaster SALVIN and GODMAN, Biol. Centr.-Am., Aves, I, 1886, 430, part (Nairapi and Sorata, Bolivia).

Chrysomitris stejnegeri SHARPE, Cat. Birds Brit. Mus., XII, 1888, 210 (Sorata and Nairapi, Bolivia [no type designated]; orig. descr.; type in coll. Brit. Mus.).

Chrysomitris xanthogastra var. stejnegeri DUBOIS, Syn. Avium, I, 1901, 592 (ref. orig. descr.; range).

Spinus stejnegeri SHARPE, Hand-List Birds, V, 1909, 230 (in list of species; range). —BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).

Subspecific characters. Similar to Spinus xanthogaster xanthogaster, but slightly larger, and yellow of under parts in adult male averaging

purer; female with the throat underlaid by black, presenting a clouded appearance.

Measurements. Male (five specimens): wing, 66–69 (average, 68); tail, 44–45 (44.5); bill, 9.5–10.5 (10); tarsus, 13–14 (13.5). Female (three specimens): wing, 66–67 (66.5); tail, 41–44 (42.5); bill, 9.5–10 (9.8); tarsus, 13–14 (13.5).

Range. Subtropical Zone, Andes of Bolivia.

Remarks. Instead of being specifically distinct, as given by Sharpe, the present form in only a subspecies of *xanthogaster*, and not a strongly marked one at that, so far at least as the characters of the males are concerned. The three adult females, however, are readily separable from northern birds of the same sex by the rather purer yellow color of the under parts, combined with a blackish under shading on the throat, suggesting the immature dress of the male in some other species. These three birds do not at all confirm Sharpe's description of this sex, but do confirm his suspicions about Buckley's sexing of specimens.

This form appears to be known only from the Yungas of Bolivia, but should be looked for in Peru.

Specimens examined. Bolivia: Iquico (3500 m.), 4; Chaco, Yungas, 2; Songo, 1; Apolobamba, 1; Yungas, near La Paz, 1; Cerro Hosane, 1. Total, 10.

Spinus atratus (Lafresnaye and D'Orbigny).

Carduelis atratus LAFRESNAYE and D'ORBIGNY, Mag. de Zool., 1837, Syn. Avium, 83 (La Paz; Bolivia; orig. descr.; cotype now in coll. Mus. Comp. Zool.).— D'ORBIGNY, Voy. Am. Mér., 1835-44, 364, pl. 48, fig. 2 (La Paz, Bolivia; descr.; habits).—HARTERT and VENTURI, Nov. Zool. XVI, 1909, 176 (Lara and Cerro Munos, Tucumán, and Angosta Pardieta, Jujuy, Argentina).

Fringilla atrata GRAY, Gen. Birds, II, 1849, 371 (in list of species; ref. descr.).

Chrysomitris atrata BONAPARTE, Consp. Avium, I, 1850, 515 (diag.; ref. descr.).-LICHTENSTEIN, Nom. Avium Mus. Zool. Berolinensis, 1854, 46 (Chile).--(?)BUR-MEISTER, Journ. f. Orn., VIII, 1860, 257 (Sierra de Mendoza, Argentina; descr. female?).-BURMEISTER, Reise La Plata-Staaten, II, 1861, 490 (Sierra de Uspallata, Argentina; descr.; references).-SCLATER, Cat. Am. Birds, 1861, 125 (Bolivia; references).-CASSIN, Proc. Acad. Nat. Sci. Philadelphia, 1865, 91 (references; crit.).-von PELZELN, Reise Novara, Zool., I, 1865, 92 (Chile).-SCLATER, Proc. Zool. Soc. London, 1867, 322 (crit.).-SCLATER and SALVIN, Proc. Zool. Soc. London, 1869, 152 (Pitumarca, Peru).-GRAY, Hand-List Birds, II, 1870, 81 (in list of species; range).-GIEBEL, Thes. Orn., I, 1872, 673 (references).-SCLATER and SALVIN, Nom. Avium Neotrop., 1873, 34 (Bolivia and Peru, in range).-TACZANOWSKI, Proc. Zool. Soc. London, 1874, 523 (Junin, Peru; descr. nest and eggs).-ALLEN, Bull. Mus. Comp. Zool., III, 1876, 353 (Lake Titicaca, Peru; habits).-SCLATER and SALVIN, Proc. Zool. Soc. London, 1879, 607 (La Paz, Bolivia).-HEINE and REICHENOW, Nom. Mus. Heineani Orn., 1882, 93 (Cordillera of Chile[?]).-TACZANOWSKI, Orn. Perou, III, 1886, 53; Tables, 86 (Junin, Tarma, Huanta, Puno, Acancocha, and Queropuguio, Peru; descr.; habits; descr. nest and eggs; references) .- VON BERLEPSCH, Journ. f. Orn., XXXV, 1887, 130 (range).-SCLATER, Proc. Zool. Soc. London, 1886, 396, 397 (Huasco and Sacaya, Tarapacá, Chile).-BARTLETT, Mon. Weaver-Birds, etc., i, 1888, pl. 1 and text (La Paz, Bolivia; Mendoza, Argentina; descr.; references; habits; meas.).-SHARPE, Cat. Birds Brit. Mus., XII, 1888, 212 (Pitumarca, Peru; Mendoza, Argentina; Bolivia; descr.; references).-SCLATER and Hudson, Argentine Orn., I, 1888, 65 (Sierra of Uspallata, Mendoza, Argentina, ex Burmeister; descr.; references).-PHILIPPI, Ornis, IV, 1888, 159 (Colarados II, Chile).-SCLATER, Proc. Zool. Soc. London, 1891, 134 (Sacaya and Lake of Huasco, Tarapacá, Chile) .-- JAMES, New List of Chilian Birds, 1892, 2 (Tarapacá, Chile).-LANE, Ibis, 1897, 22 (Huasco and Sacaya, Chile; habits).-ALBERT, Contr. Est. Aves Chilenas, xi, 1901, 456 (Chile; descr.; meas.; habits) .-- DUBOIS, Syn. Avium, I, 1901, 592 (references; range) .--LILLO, An. Mas. Nac. Buenos Aires, (3), I, 1902, 178 (Province Tucumán, Argentina).—BAER, Ornis, XII, 1904, 216 (Lara, Tucumán, Argentina).— LILLO, Rev. Letras y Ciencias Sociales, 1905, p. 10 of reprint (Mountains of Tucumán, Argentina).-REED, Hist. Nat. Aves Chilenas, 1907, 60, in text (Tarapacá, Chile).-FONTANA, Enum. sist. aves Region Andina, 1908, 8 (Argentina).

Fringilla atratus EYTON, Cat. Birds, 1856, 257 (interior of Bolivia).

- Chrysomitris anthracina PHILIPPI, An. Univ. Chile, XCI, 1895, 675 (Prov. San Fernando, Chile]?]; orig. descr.; type in Nat. Mus. Chile).—PHILIPPI, An. Mus. Nac. Chile, XV, Zool., 1902, 56, pl. 17, fig. I (San Fernando, Chile; descr.; crit.).
- Spinus atratus VON BERLEPSCH and STOLZMANN, Proc. Zool. Soc. London, 1896, 353 (Ingapirca, Maraynioc, Jauja, and Tarma, Peru; La Paz, Bolivia).—SHARPE, Hand-List Birds, V, 1909, 230 (in list of species; range).—DABBENE, An. Mus. Nac. Buenos Aires, (3); XI, 1910, 387 (Argentine references and range).— (?)OGILVIE-GRANT, Cat. Birds' Eggs Brit. Mus., V, 1912, 179 (Tumbez, Peru [error!]; descr. egg).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).—CHAPMAN, Bull. U. S. Nat. Mus., No. 117, 1921, 39 (faunal range), 110 (Ollantaytambo and La Raya, Peru).

Spinus anthracinus SHARPE, Hand-List Birds, V, 1909, 230 (ref. orig. descr.; range). —BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).

Description. Adult male: black, except the lower abdomen, tibiæ, and crissum, which are lemon-chrome, and the basal half of the remiges and rectrices, which are of the same color, except that the outermost primary is entirely black on the outer web, and the middle pair of rectrices are wholly black; primary-coverts black; greater coverts with yellow terminal spots; under wing-coverts mottled black and yellow. In fresh, unworn plumage there is a narrow white or yellowish margin to the outer webs and tips of the inner secondaries. "Iris brown; bill black above, brownish yellow below; feet brownish plumbeous."

Adult female: similar to the male, but the black duller, more brownish, and more or less overlaid with dull greenish yellow, especially below, this color tending to extend upwards along the median line from the lower abdomen, in irregular pattern.

Juvenal plumage: similar to that of the adult female, but still duller and browner, the yellow of the under parts paler, more buffy yellow, and the greater and middle wing-coverts tipped with buffy, forming two bands across the wing.

Measurements. Male: wing, 81-86 (average, 82); tail, 50-56 (52.5); bill, 9-11 (10); tarsus, 15-17 (16). Female: wing, 76-81 (78); tail, 45-54 (50); bill, 9.5-10 (9.7); tarsus, 15.5-17 (16).

Range. Andes of Peru (Province of Junin), Bolivia, Chile, and Argentina (Province of Tucumán), breeding in the Puna Zone.

Remarks. Females in imperfect plumage (illustrated by Nos. 174,367–8, Collection American Museum of Natural History, Chipa, Junin, Peru) are duller and paler than those in perfect plumage, being flammulated below with dusky and greenish yellow, and tinged with grayish. The original description of this species is unmistakable, as also is the later plate by D'Orbigny. The description given by D'Orbigny, however, is confused, but, such as it is, applies better to these examples; moreover, there is a cotype in the Lafresnaye Collection (now in the Museum of Comparative Zoölogy) that has been examined in this connection. Birds from Peru appear to have the yellow of the underparts running up on the median line of the abdomen more often than those from Argentina, but the difference is inconstant. The yellow pattern of the tail varies considerably; in some specimens it is cut squarely off, and in others it is obliquely separated from the black.

Philippi has described and figured a black Goldfinch from San Fernando, Chile, under the specific name *anthracinus*, on the ground of its supposed less yellow. The fact is that the amount of yellow on the underparts, tail, and wings in this species is subject to considerable variation, and while it is hazardous to express an opinion without having seen either the type or topotypical material, I suspect that *anthracinus* will prove to be based on an individual variant of *atratus*, and am provisionally throwing it into synonymy. No one has recognized it since, except on Philippi's authority. There is a possibility, however, that birds from the southern extremity of the range of the species may show the peculiarities he claims. On the other hand, Bartlett figures an example said to have been collected by Weishaupt at Mendoza, Argentina (a locality not far distant from San Fernando,

Chile), which is not different from northern specimens. But considerable doubt attaches to all these southern records. Burmeister's records for this part may refer to some other species, and Weishaupt may have had only cage-birds. It is significant that no recent collector has met with the species here. Dr. Hellmayr writes me that the type-locality of *anthracinus*, San Fernando, is almost certainly erroneous, since he is assured by Mr. Colin Sanborn that the black *Spinus* is not found anywhere in central Chile except as a cage-bird.

According to Dr. Chapman *Spinus atratus* is a bird of the Puna Zone in Peru, but as it is recorded by other authors from lower altitudes it probably ranges lower down at times. Jelski found it nesting under thatched roofs at Junin, Peru, a very peculiar situation, one would think, and Taczanowski describes eggs collected by him as greenish white, spotted or streaked with reddish or blackish brown. The locality "Tumbez, Peru" quoted by Ogilvie-Grant as a nesting record must be an error. (It may be that the Peninsula of Tumbes, Chile, is meant instead.) In its appropriate zone it is said to be a common bird, with the general habits of the rest of the group.

Specimens examined. Peru: Ollantaytambo, 1; La Raya, 6; Lake Titicaca, 3; Anta, Cuzco, 1; Chipa (12,400–14,000 ft.), Junin, 8; Puno, Lake Titicaca (12,500 ft.), 2; Oroya, Rio Mantaro, 2. Bolivia: Colomi, 1; Poopo, 1; La Paz, 6; Guaqui, 18; Desaguadero, 1; Esperanza, 1; unspecified, 2. Chile: Ojo de San Pedro (12,400 ft.), Antofogasta, 2. Argentina: Lara (3200 m.), Tucumán, 3; Sierra del Cajón (3800 m.), Salta, 3; Tilcara (2470 m.), Jujuy, 6; El Alisal, Sierra del Cajón (2800 m.), Salta, 1; Antofagasta (3100–3200 m.), "Catamarca," [Los Andes?], 4; Angosta Perchela, Jujuy, 1; Volcan (7000 ft.), Jujuy, 1; unspecified, 1. Total, 75.

Spinus uropygialis (Sclater).

Chrysomitris xanthomelaena REICHENBACH, in Bibra, Denks. K. Akad. Wiss. Wien, Math.-nat. Cl., V, 1853, 130 (Cordillera of Chile; nomen nudum).— ZUCHOLD, Journ. f. Orn., III, 1855, 55 (reprint orig. account).

Chrysomitris atratus (not Carduelis atratus Lafresnaye and D'Orbigny) CASSIN, in Gilliss' U. S. Astr. Exped., 1855, 181 (Chile).

Chrysomitris uropygialis SCLATER, Cat. Am. Birds, 1861, 125 (Chile; orig. descr.; type now in coll. Brit. Mus.).—CASSIN, Proc. Acad. Nat. Sci. Philadelphia, 1865, 91 (Chile; crit.).—VON PELZELN, Reise Novara, Zool., I, 1865, 92 (Chile).—SCLATER, Proc. Zool. Soc. London, 1867, 322 (Chile; crit.), 338 (in list of species).
—PHILIPPI, An. Univ. Chile, XXXI, 1868, 263, 295, 303, 316, 325 (Chile), 329

77

(Santiago, Chile).—GIEBEL, Thes. Orn., I, 1872, 675 (references).—SCLATER and SALVIN, Nom. Avium Neotrop., 1873, 34 (Chile, in range).—TACZANOWSKI, Orn. Perou, III, 1886, 54, Tables, 86 (Lima and San Mateo, Peru [??]; descr.; references).—BARTLETT, Mon. Weaver-Birds, etc., ii, 1888, pl. 2 and text (Chile; descr.; references; habits, fide Weishaupt; measurements).—SHARPE, Cat. Birds Brit. Mus., XII, 1888, 211 (Chile; descr.; references).—JAMES, New List of Chilian Birds, 1892, 2 (Chile, resident).—REED, Ibis, 1893, 596 (Chile; seasonal occurrence).—DUBOIS, Syn. Avium, I, 1901, 592 (references; range).—LÖNN-BERG, Ibis, 1903, 451 (Moreno, Jujuy, Argentina).—REED, Hist. Nat. Aves Chilenas, 1907, 60, in text (mountains of Chile).

Chrysomitris xanthomelana PHILIPPI, An. Univ. Chile, XXXI, 1868, 325 (syn.).

Fringilla xunthomelæna GRAY, Hand-List Birds, II, 1870, 81 (in list of species; range).

Fringilla uropygialis GRAY, Hand-List Birds, II, 1870, 81 (in list of species; range). Melanomitris uropygialis GOSSE, in FitzGerald, The Highest Andes, 1899, 347 (Punta de las Vacas, Chile; habits).

Chrysomitris uropigialis ALBERT, Contr. Est. Aves Chilenas, xi, 1901, 454 (Chile; descr.; meas.; habits).

Spinus uropygialis SHARPE, Hand-List Birds, V, 1909, 230 (in list of species; range).—DABBENE, An. Mus. Nac. Buenos Aires, (3), XI, 1910, 387 (Argentine references and range).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).—DABBENE, Bol. Soc. Physis, I, 1914, 356 (Argentine records and references).

Description. Adult male: head all around, throat, and upper breast black; back black, the feathers with prominent margins of yellowish oil-green, giving a mottled squamate effect; rump yellow, the feathers with dark bases, sometimes showing through; longer upper tail-coverts and tail black, the basal two-thirds of the rectrices (except the central pair) lemon-yellow; wings brownish black, with a broad lemon-yellow basal band, wanting on the outer web of the outermost primary (sometimes on the next also); primary-coverts black; under wing-coverts lemon-yellow; secondaries margined externally with yellowish white toward their tips; under parts, from the middle of the breast down, lemon-yellow to lemon-chrome, the flanks with more or less black mottling, and the under tail-coverts sometimes showing traces of black streaks; "iris dark brown;" bill plumbeous; feet brown.

Female similar, but duller than the male, the black of the head and throat more or less mottled with yellowish oil-green, like the back; the yellow of the under parts, rump, etc., duller and with more indication of dark streaks.

"The very young birds are almost green above, the forehead and chin blackish" (Bartlett).

Measurements. Male: wing, 79-86 (82); tail, 50-57 (52.5); bill, 9-10 (9.5); tarsus, 15.5-17 (16). Female (four specimens): wing, 80-83 (82); tail, 50-54 (52); bill, 9-10 (9.5); tarsus, 16-16.5 (16.1). Range. Andes of central Chile and northern Argentina, south at least to the Province of Santiago.

Remarks. The affinities of this very distinct species appear to lie with *S. atratus*, which it resembles in general proportions and to some extent in coloration. It is difficult to make out its exact range from the few specimens and records to which precise localities are attached, but from what little information is available it appears to be a species of the high cordillera of the Andes, dropping down to lower levels when not breeding. While according to Taczanowski it has been taken by Raimondi at Lima and San Mateo in Peru, this is surely a mistake, since none of the recent workers in this region have encountered it there, and there are no records for Bolivia whatever. But the exact limits of its range remain in doubt, as well as its exact faunal relationships to *S. barbatus* and *S. atratus*.

Specimens examined. Chile: Tofo (60 mi. N. of Coquimbo), 6; El Peñon (bajon del Rio Aconcagua), 3; Santiago, 3; San José de Maipo (3000 ft.), Santiago, 1; unspecified, 6. Total, 20.⁴

Spinus barbatus (Molina).

- Fringilla barbata MOLINA, Saggio Hist. Nat. Chile, 1782, 247, 345 (Chile; orig. descr.; no type or type-locality specified; habits, etc.); ed. 2, 1810, 209 (descr., etc.).—GMELIN, Syst. Nat., I, ii, 1789, 915 (descr., etc., ex Molina).—LATHAM, Ind. Orn., I, 1790, 456 (descr., etc., ex Molina).—STEPHENS, in Shaw's Gen. Zool., IX, ii, 1816, 484 (references; descr., etc., ex Latham).—GRAY, Hand-List Birds, II, 1870, 82 (in list of species; range).
- "Bearded Finch" LATHAM, Sup. Gen. Syn. Birds, 1802, 208 (descr., etc., ex Molina).
- Fringilla magellanica (not of Vieillot) LESSON, Traité d'Orn., 1831, 443 ("Iles Malouines" [Falkland Islands]).
- Carduelis stanleyi AUDUBON, Syn. Birds N. Am., 1839, 118 ("Upper California" [=Valparaiso, Chile]; orig. descr.; type now in U. S. Nat. Mus.).—AUDUBON, Birds Am., oct. ed., III, 1841, 137, pl. 185, female ("California"; descr.).— STONE, Auk, XXIII, 1906, 308 (Audubon's reference).
- Chrysomitris campestris (not Fringilla campestris Spix) DARWIN, Zool. Voy. Beagle, Birds, III, iv, 1839, 89 (Tierra del Fuego and Valparaiso, Chile; descr.).— FRASER, Proc. Zool. Soc. London, 1843, 112 (Valparaiso, Chile).
- Chrysomitris campestris DESMURS, in Gay, Hist. Chile, Zool., I, 1847, 352 (Chile; descr.; habits).--von PELZELN, Reise Novara, Zool., I, 1865, 92 (Chile).

Fringilla stanleyi GRAY, Gen. Birds, II, 1849, 371 (in list of species; ref. orig. descr.).—GRAY, Hand-List Birds, II, 1870, 82 (in list of species; range).

Chrysomitris stanleyi BONAPARTE, Consp. Avium, I, 1850, 515 (diag.; ref. orig.

⁴Dr. Hellmayr writes me that the Field Museum has lately received a specimen from Caldera, Atacama, Chile.

descr.).—BAIRD, Rept. Pacific R. R. Surveys, IX, 1858, 418 (diag.), 419 (meas.), 420 (descr.; references; crit.).—BAIRD, BREWER, and RIDGWAY, Hist. N. Am. Birds, I, 1874, 471, in text (crit.).—Allen, Bull. Nuttall Orn. Club, V, 1880, 88 (crit. on range).

- Chrysomitris marginalis BONAPARTE, Consp. Avium, I, 1850, 517 (Chile; orig. descr.; types in coll. Berlin Mus. and Paris Mus.).—CABANIS, Mus. Heineanum, I, 1851, 160 (Chile; ref. orig. descr.).—CASSIN, in Gilliss' U. S. Astr. Exped., 1855, 181, pl. 17 (Chile; descr.).—BURMEISTER, Reise La Plata-Staaten, II, 1861, 490 (Mendoza, Argentina; references).
- Hypacanthis stanleyi CABANIS, Mus. Heineanum, I, 1851, 161, note (ref. orig. descr.).
- Crithagra flavospecularis HARTLAUB, Naumannia, 1853, 213 (Valdivia, Chile; orig. descr.; type?).
- Chrysomitris noveboracensis LICHTENSTEIN, Nom. Avium Mus. Zool. Berolinensis, 1854, 46 (Chile; nomen nudum).

Fringilla sp. EYTON, Cat. Birds, 1856, 256 (Chile).

- Chrysomitris barbata PHILIPPI, Arch. f. Naturg., XXVI, 1860, 28 (Chile; syn.; crit.).—SCLATER, Cat. Am. Birds, 1861, 125, part (Falkland Islands; references). -CASSIN, Proc. Acad. Nat. Sci. Philadelphia, 1865, 90 (Valparaiso, Chile; syn.; crit.).—SCLATER, Proc. Zool. Soc. London, 1867, 322 (Chile; syn.; crit.), 338 (in list of species).-SCLATER and SALVIN, Ibis, 1868, 185 (range), 186 (Gregory Bay, Straits of Magellan); 1870, 499 (Ancud and Sandy Point, Straits of Magellan).—GIEBEL, Thes. Orn., I, 1872, 673 (references).—HEINE and REICHE-NOW, Nom. Mus. Heineani Orn., 1882, 93 (Valdivia, Chile).-SHARPE, Cat. Birds Brit. Mus., XII, 1888, 216, excl. Maldonado ref. (Falkland Islands, Straits of Magellan, and Tierra del Fuego; descr.; references).-OUSTALET, Miss. Sci. Cap-Horn, VI, 1891, B99 (localities in Straits of Magellan and Tierra del Fuego; plumage; references).-LANE, Ibis, 1897, 21 (Corral, Coronel, Callecalle, Maquegua, Arauco, Valdivia, Rio Bueno, and Ancud, Chiloe Island, Chile; range; habits).—SCHALOW, Zool. Jahrb., Suppl. IV, iii, 1898, 722 (range). -SALVADORI, Ann. Mus. Civ. di Stor. Nat., (2), XX, 1900, 622 (Punta Arenas, Chile, and Penguin Rookery, Staten I.).-ALBERT, Contr. Est. Aves Chilenas, xi, 1901, 458 (Chile; descr.; meas.; habits).-DUBOIS, Syn. Avium, I, 1901, 592 (references; range).-DABBENE, An. Mus. Nac. Buenos Aires, (3), I, 1902, 361 (Ushuaia, Tierra del Fuego; references; range [part]).—REED, Aves Province Concepción, 1904, 36, 55 (Province Concepción, Chile).-CRAWSHAY, Birds of Tierra del Fuego, 1907, 49, excl. Durnford ref. (Rio McClelland Settlement, Tierra del Fuego; references; habits).-REED, Hist. Nat. Aves Chilenas, 1907, 60 (Chile; habits, etc.).
- Chrysomitris magellanica SCLATER, Proc. Zool. Soc. London, 1861, 46 (Falkland Is., fide Abbott).—LYNCH-ARRIBALZAGA, An. Mus. Nac. Buenos Aires, (3), I, 1902, 166 (Lago General Paz, Argentina).
- Chrysomitris magellanicus ABBOTT, Ibis, 1861, 154 (Stanley and Keppel Islands, Falkland Islands).

Hypocanthis stanleyi COOPER, Bull. Nuttall Orn. Club, II, 1877, 92 (crit.).

Astragalinus stanleyi RIDGWAY, Proc. U. S. Nat. Mus., III, 1880, 213, and Bull. U. S. Nat. Mus., No. 21, 1881, 59 (crit. on range). Spinus barbata ALLEN, Bull. Am. Mus. Nat. Hist., II, 1889, 83 (Valparaiso, Chile). Chrysomitris icterica (not Fringilla icterica Lichtenstein) NEHRKORN, Kat. Eiersammlung, 1899, 107 (Chile; descr. eggs).

- Spinus barbatus SHARPE, Hand-List Birds, V, 1909, 231 (in list of species; range).—
 DABBENE, An. Mus. Nac. Buenos Aires, (3), XI, 1910, 387 (Argentine references and range).—BRABOURNE and CHUBB, Birds S. Am., I, 1912, 373 (ref. orig. descr.; range).—OGILVIE-GRANT, Cat. Birds' Eggs Brit. Mus., V, 1912, 181 (descr. eggs).—PÄFSLER, JOURN. f. Orn., LXX, 1922, 475 (Coronel, Chile; habits).
 —PETERS, Bull. Mus. Comp. Zool., LXV, 1923, 330 (Bariloche, Argentina).
- Spinus ictericus ictericus PETERS, Bull. Mus. Comp. Zool., LXV, 1923, 331 (Rio Colorado, Argentina).

Description. Adult male: above warbler-green, obscurely streaked with darker centers to the feathers, the rump brighter, oil-yellow, unstreaked, the upper tail-coverts dusky brownish, with greenish and gravish margins and tips; tail dull black, the rectrices with narrow grayish white margins and pale lemon-yellow bases, concealed except on the lateral feathers; wings dull black with a broad basal band of pale lemon-yellow (omitted on the outer three primaries), the remiges with narrow outer margins of warbler-green, becoming wider and tinged with grayish on the secondaries; wing-coverts dull black, with warbler-green tips; primary-coverts and median portion of secondaries plain black; under wing-coverts dull white, tinged with yellow; pileum black; sides of head and neck pyrite-yellow, the auriculars darker (warbler-green); throat-patch dull black, more or less veiled with greenish feather-edgings, the pattern not sharply defined; under parts in general dull yellow (between lemon-yellow and pyrite-yellow), becoming pale smoke-gray on the abdomen medially and warblergreen on the flanks; under tail-coverts yellow-tinged, and with indications of dusky streaks; "iris brown; bill brown above, blackish horn below; feet brownish."

Female similar in general, but duller, the pileum like the rest of the upper parts, the black throat-patch wanting, the under parts paler yellow, the grayish white of the posterior under parts more extended and the under tail-coverts with little or no yellowish tinge.

Juvenal plumage: similar to that of the adult female, but duller, more or less tinged with brownish above, the median and greater wing-coverts with buffy yellowish tips. A female in juvenal dress (Quellon, Chiloe Island, Chile, January 3) has the throat alone of all the lower parts, yellow-tinged. Young males appear to pass from this dress into a stage, wherein they closely resemble the adult female, but with an indication of the black throat-patch, although this may be acquired at the next moult.

Three females are in what I have designated as *imperfect plumage*. Above they are deep olive-gray, tinged with warbler-green, and below almost uniform pale smoke-gray; the wing- and tail-pattern, however, is virtually the same as in the perfect plumage, and the pattern of the sides of the head is also indicated. At this stage the

bird suggests the American Goldfinch ("Astragalinus" tristis) in winter dress.

Measurements. Male: wing, 73–76 (average, 74.5); tail, 50–53 (51); bill, 10–11 (10.5); tarsus, 15.5–17 (16.3). Female: wing, 68–75 (72); tail, 49–52 (50); bill, 10–10.5 (10.3); tarsus, 16–17 (16.5).

Range. Andean region of Chile and western Argentina, north to the Province of Atacama, south to Cape Horn and the Falkland Islands.

Remarks. Molina's description of this species is most inaccurate, and must have been drawn up from memory alone. Indeed, it is recognizable mainly because he refers to the bird as the "Gilghero" (or "Jilguero") of the natives, under which name it still passes, and because he gives such a good account of its habits. In 1839 Audubon gave a good description of his Carduelis stanleyi, based on a specimen supposed to have come from "Upper California," but which was almost certainly collected by Townsend at Valparaiso, Chile. On this account I propose to designate Valparaiso as the type-locality for the species. Three additional synonyms, by Bonaparte, Hartlaub, and Lichtenstein respectively, followed in rapid succession in 1850-53, while some other authors confused it with the Fringilla campestris of Spix. In 1860, however, Philippi pointed out the pertinence and priority of Molina's name barbatus, which has been in common use since, although certain other forms have been confused with this species at one time or another.

Spinus barbatus appears to more closely resemble Spinus spinus of the Palæarctic Region than do any of the other South American forms. In general coloration the two are nearly alike in adult male plumage, except that spinus has the flanks more or less streaked, while in barbatus they are plain, the under tail-coverts alone retaining traces of streaks. The yellow of the tail is more restricted, too, in barbatus, and the bill is stouter. In juvenal dress, however, the two species are unlike, the heavy streaking of spinus not being in evidence in barbatus, which is thus a step in advance of the other.

I can detect no geographical differences between birds coming from extremes of the range of the species, but there is considerable seasonal and individual variation, also some due to age, as already indicated. In worn plumage the pale outer edgings of the secondaries disappear, and the yellowish green of the upper parts tends to grow brighter. Sometimes the middle pair of rectrices in males are yellow at the base, like the rest, but more often they are wholly black. Females always have this yellow area much restricted, and sometimes virtually wanting, while that on the wing is also smaller than in the males. These characters will serve to distinguish the species from *S. magellanicus* in the same stage, since this latter always has more yellow, sex for sex, on the wings and tail.

The available records would indicate that S. barbatus is a characteristic species in the Andes of Chile, ranging as far north as the Province of Atacama, and thence southward to the extremity of the South American continent. North of the latitude of Concepción it appears to be confined to the western slope of the mountains, but here crosses the divide, and occurs on the eastern side, in Argentina, in the neighborhood of Lakes Nahuel Huapi and General Paz. Specimens from General Roca, on the Rio Negro, and from Rio Colorado, on the river of the same name, indicate that it ranges well to the eastward in this section. I can find no records from 44° south latitude until the Straits of Magellan are reached, but it undoubtedly occurs in the intervening region, avoiding here, as it does farther north, the open treeless plains of Patagonia. On the Falkland Islands it is scarcely more than accidental. Several authors refer to its being found on the coast of Chile only during the winter, retiring to the mountains to breed, but just how far north this statement applies is not entirely clear, although its breeding range would be expected to run northward along the Andes, all else being equal. In its habits the Chilean Goldfinch is said to closely resemble the Siskin of the Old World, and to have a beautiful song, for which reason it is often kept in captivity.

Specimens examined. Chile: Valparaiso, 2; Maquehuc, Temuco, Cautin, 3; Apoquimbo, 1; Los Andes, 4; Corral, 4; Taleahuano, 1; Rio Colorado, Malleco, 1; Curacautin, 1; Ramadilla, Copiapo Valley, Atacama, 3; Romero, Coquimbo, 2; San José de Maipo (3000 ft.), Santiago, 4; Melinka, Ascension Island, Guaiteca Islands, 4; Quellon, Chiloe Island, 4; Concon, Valparaiso, 1; Valdivia, 3; Frutillar cerca de Puerto Moutt, 3; [Peninsula of] Tumbes, 1; Punta Arenas, 27; unspecified, 5. Argentina: Lago General Paz, Chubut, 1; Valle del Rio Chubut, 2; Nahuel Huapi, Neuquen, 9; Bariloche, 8; Rio Colorado, 1; Fujuy Veldt, Rio Chico, 1; General Roca, Rio Negro, 1. Tierra del Fuego: Bahia Parvenir, 2; off Staten Island, 1; Cape Horn, 2; Laredo Bay, 1. Unspecified, 1. Total, 104.